



Volume 1 of 1 Project Manual

**Energy Upgrades - Greater Bridgeport Community
Mental Health Center
1635 Central Avenue
Bridgeport, CT
Project No.: BI-MH-111**

**Prepared By:
Fuss & O'Neill, Inc.
146 Hartford Road
Manchester, CT
06040**

Josh Geballe – Commissioner

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

Project Manual Date: May 1, 2019

FOR YOUR INFORMATION

IMPORTANT NOTICE

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

THIS PROJECT MANUAL CONTAINS NEW REPORTING AND CONTRACTING REQUIREMENTS:

05/14/19: UPDATED SECTION 00 72 13.1 SUPPLEMENTARY CONDITIONS:

The following Articles of the 00 72 13.1 Supplementary Conditions have been revised or added:

- **Article 1 Definitions:** Section 1.71 and Section 1.72;
- **Article 3 Correlation of Contract Documents:** Section 3.6;
- **Article 28 Partial Payments:** Section 28.2;
- **Article 35 Contractor's Insurance:** Section 35.1 and Section 35.6 (See Section 35.6 as follows):

Section 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:** Section 36.3;
 - **Article 40 Disclosure of Records:** Section 40.1; and
 - **Article 41 Audit and Inspection of Plants, Places of Business, and Records:** Section 41.1.

02/01/19: NEW REPORTING & CONTRACTING REQUIREMENTS FOR SUBCONTRACTOR PAYMENTS:

NEW REPORTING REQUIREMENTS FOR CONTRACTOR AND SUBCONTRACTOR PAYMENTS:

- For compliance with the Connecticut General Statutes Sections 4b-95 and 49-41a, the Department of Administrative Services-Construction Services (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.
- Detailed instructions can be found in the DAS/CS publication, "**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.

NEW CONTRACTING REQUIREMENTS FOR CONTRACTOR AND SUBCONTRACTOR PAYMENTS:

- 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.

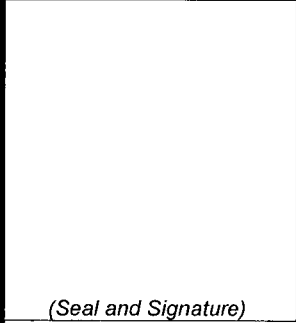
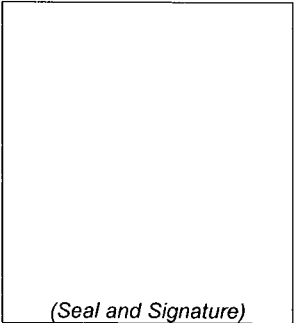
THE FOLLOWING DOCUMENTS HAVE BEEN REVISED TO REFLECT THE NEW REQUIREMENTS:

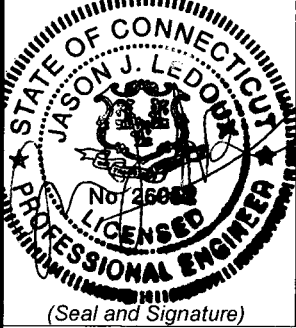
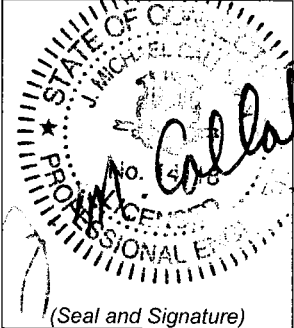
- Section 00 11 16 Invitation to Bid;
- Section 00 21 13 Instructions to Bidders;
- Section 00 41 10 Bid Package Submittal Requirements; and
- Section 01 11 00 Summary of Work.

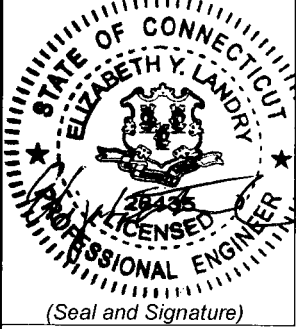
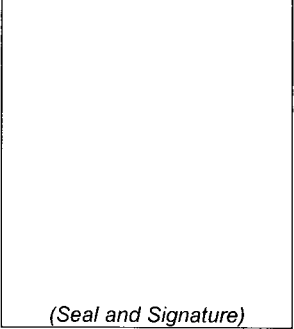
END

Project Title:	Energy Upgrades - Greater Bridgeport Community Mental Health Center
Project Location:	Bridgeport, CT
Project Number:	BI-MH-111
Architect/Engineer:	Fuss & O'Neill, Inc., 146 Hartford Road, Manchester, CT, 06040

SEALS, SIGNATURES, AND DATES OF DESIGN PROFESSIONALS OF RECORD

 (Seal and Signature)	<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>_____ (Print Consultant Name)</p> <p>_____ License No.</p> <p>_____ Expiration Date</p>	 (Seal and Signature)	<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>_____ (Print Consultant Name)</p> <p>_____ License No.</p> <p>_____ Expiration Date</p>
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 (Seal and Signature)	<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>JASON LEDOUX, PE (Print Consultant Name) PEN.0026052 License No. 1/31/2020 Expiration Date</p>	 (Seal and Signature)	<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>MICHAEL CALLAHAN, PE (Print Consultant Name) PEN.0014118 License No. 1/31/2020 Expiration Date</p>
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 (Seal and Signature)	<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>ELIZABETH LANDRY, PE (Print Consultant Name) PEN.0028435 License No. 1/31/2020 Expiration Date</p>	 (Seal and Signature)	<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>_____ (Print Consultant Name)</p> <p>_____ License No.</p> <p>_____ Expiration Date</p>
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**End of Section
 00 01 07 Seals Page**

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DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

Section No.	Title	Page Count	Not Used
00 01 01	Title Page	1	<input type="checkbox"/>
00 01 07	Seals Page	1	<input type="checkbox"/>
00 01 10	Table of Contents	7	<input type="checkbox"/>
00 01 15	List of Drawing Sheets	1	<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	3	<input type="checkbox"/>
00 30 00	General Statements for Available Information	2	<input type="checkbox"/>
00 30 10	General Statement for Existing Conditions Survey		<input checked="" type="checkbox"/>
00 30 20	General Statement for Environmental Assessment Information		<input checked="" type="checkbox"/>
00 30 30	General Statement for Hazardous Building Materials Inspection and Inventory		<input type="checkbox"/>
00 30 40	General Statement for Subsurface Geotechnical Report		<input checked="" type="checkbox"/>
00 30 50	General Statement for Elevator Agreement		<input checked="" type="checkbox"/>
00 30 60	General Statement for FM Global Checklist for Roofing Systems		<input checked="" type="checkbox"/>
00 30 70	General Statement for "Statement of Special Inspections"		<input checked="" type="checkbox"/>
00 30 80	General Statement for Additional Information		<input checked="" type="checkbox"/>
00 40 14	Certificate (of Authority)	2	<input type="checkbox"/>
00 40 15	CT DAS Contractor Prequalification Forms	4	<input type="checkbox"/>
00 41 00	Bid Proposal Form	9	<input type="checkbox"/>
00 41 10	Bid Package Submittal Requirements	4	<input type="checkbox"/>
00 43 16	Standard Bid Bond	1	<input type="checkbox"/>
00 45 14	General Contractor Bidder's Qualification Statement	7	<input type="checkbox"/>
00 45 15	Objective Criteria Established for Evaluating Qualifications of Bidders	3	<input type="checkbox"/>
00 45 17	Named Subcontractor Bidder's Qualification Statement	7	<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 72 13	General Conditions of the Contract for Construction – For Design-Bid-Build	25	<input type="checkbox"/>
00 72 13.1	Supplementary Conditions	5	<input type="checkbox"/>
00 73 27	Set-Aside Contractor Schedule – <i>SAMPLE</i>	1	<input type="checkbox"/>
00 73 38	CHRO Contract Compliance Regulations	7	<input type="checkbox"/>
00 73 44	Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification	35	<input type="checkbox"/>
00 73 63	CT DOC Security Requirements	3	<input checked="" type="checkbox"/>
00 92 10	Additional Forms To be Submitted After Bond Commission Funding Approval	7	<input type="checkbox"/>
00 92 30	Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors	2	<input type="checkbox"/>

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(continued)

DIVISION 01 GENERAL REQUIREMENTS

Section No.	Title	Page Count	Not Used
01 11 00	Summary of Work	10	<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	5	<input type="checkbox"/>
01 26 00	Contract Modification Procedures	4	<input type="checkbox"/>
01 29 76	Progress Payment Procedures	5	<input type="checkbox"/>
01 31 00	Project Management and Coordination	5	<input type="checkbox"/>
01 31 19	Project Meetings	4	<input type="checkbox"/>
01 32 16	Construction Progress Schedules	3	<input type="checkbox"/>
01 32 16.13	CPM Schedules		<input checked="" type="checkbox"/>
01 32 33	Photographic Documentation		<input checked="" type="checkbox"/>
01 33 00	Submittal Procedures	8	<input type="checkbox"/>
01 35 16	Alteration Project Procedures	7	<input type="checkbox"/>
01 35 26	Government Safety Requirements	15	<input type="checkbox"/>
01 42 20	Reference Standards & Definitions	3	<input type="checkbox"/>
01 45 00	Quality Control	5	<input type="checkbox"/>
01 45 23.13	Testing for Indoor Air Quality, Baseline Indoor Air Quality, and Materials		<input checked="" type="checkbox"/>
01 50 00	Temporary Facilities & Controls	8	<input type="checkbox"/>
01 57 30	Indoor Environmental Control	2	<input type="checkbox"/>
01 57 40	Construction Indoor Air Quality Management Plan	2	<input type="checkbox"/>
01 60 00	Product Requirements	3	<input type="checkbox"/>
01 71 23	Field Engineering	2	<input type="checkbox"/>
01 73 29	Cutting and Patching	4	<input type="checkbox"/>
01 74 19	Construction Waste Management & Disposal	5	<input type="checkbox"/>
01 75 00	Starting & Adjusting	2	<input type="checkbox"/>
01 77 00	Closeout Procedures	5	<input type="checkbox"/>
01 78 23	Operation & Maintenance Data	5	<input type="checkbox"/>
01 78 30	Warranties & Bonds	5	<input type="checkbox"/>
01 80 13	Sustainable Design Requirements		<input checked="" type="checkbox"/>
01 91 00	Commissioning	6	<input type="checkbox"/>

DIVISION 10	SPECIALTIES	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count
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DIVISION 11	EQUIPMENT	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count
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DIVISION 12	FURNISHINGS	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count
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DIVISION 13	SPECIAL CONSTRUCTION	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count
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DIVISION 14	CONVEYING SYSTEMS	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count
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DIVISION 15	RESERVED	
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DIVISION 16	RESERVED	
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DIVISION 17	RESERVED	
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DIVISION 18	RESERVED	
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DIVISION 19	RESERVED	
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DIVISION 20	RESERVED	
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DIVISION 21	FIRE SUPPRESSION	Not Used <input type="checkbox"/>
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Section No.	Title	Page Count
21 13 13	WET PIPE SPRINKLER SYSTEM	10

DIVISION 22	PLUMBING	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count
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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
23 05 00	COMMON WORK RESULTS FOR HVAC	6
23 05 10	SELECTIVE DEMOLITION HVAC	4
23 05 13	COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT	4
23 05 17	SLEEVES AND SLEEVE SEALS FOR HVAC PIPING	4
23 05 19	METERS AND GAUGES FOR HVAC	4
23 05 23	GENERAL DUTY VALVES FOR HVAC PIPING	26
23 05 29	HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT	4
23 05 48	VIBRATION & SEISMIC CONTROLS FOR HVAC	3
23 05 93	TESTING ADJUSTING AND BALANCING FOR HVAC	14
23 07 00	HVAC INSULATION	4
26 07 16	HVAC EQUIPMENT INSULATION	12
23 07 19	HVAC PIPING INSULATION	16
23 09 00	DIRECT DIGITAL CONTROL SYSTEM	26
23 09 01	SEQUENCE OF OPERATIONS	8
23 09 13	INSTRUMENTATION AND CONTROL DEVICES FOR HVAC	
23 11 23	NATURAL GAS PIPING	6
23 21 13	HYDRONIC PIPING	14
23 21 14	HYDRONIC SPECIALTIES	6
23 21 23	HYDRONIC PUMPS	6
23 52 16	CONDENSING BOILERS	8
23 82 16	AIR COILS	4

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DIVISION 25	INTEGRATED AUTOMATION	Not Used <input checked="" type="checkbox"/>
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DIVISION 26	ELECTRICAL	Not Used <input type="checkbox"/>
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26 05 05	COMMON ELECTRICAL REQUIREMENTS	6
26 05 06	SELECTIVE ELECTRICAL DEMOLITION	6
26 05 19	POWER CONDUCTORS	4
26 05 33	RACEWAY AND BOXES	6
26 09 23	LIGHTING CONTROL DEVICES	6
26 22 00	LOW VOLTAGE TRANSFORMERS	4
26 28 16	SWITCHES AND CIRCUIT BREAKERS	7
26 29 13	ENCLOSED CONTROLLERS	8

DIVISION 27	COMMUNICATIONS	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count

DIVISION 28	ELECTRONIC SAFETY AND SECURITY	Not Used <input checked="" type="checkbox"/>
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Section No.	Title	Page Count

DIVISION 29	RESERVED	
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DIVISION 30	RESERVED	
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DIVISION 31	EARTHWORK	Not Used <input checked="" type="checkbox"/>
Section No.	Title	Page Count

DIVISION 32	EXTERIOR IMPROVEMENTS	Not Used <input checked="" type="checkbox"/>
Section No.	Title	Page Count

DIVISION 33	UTILITIES	Not Used <input checked="" type="checkbox"/>
Section No.	Title	Page Count

DIVISION 34	TRANSPORTATION	Not Used <input checked="" type="checkbox"/>
Section No.	Title	Page Count

DIVISION 35	WATERWAYS AND MARINE	Not Used <input checked="" type="checkbox"/>
Section No.	Title	Page Count

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"/>
Section No.	Title	Page Count

DIVISION 41	MATERIAL PROCESSING	Not Used <input checked="" type="checkbox"/>
Section No.	Title	Page Count

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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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"/>
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50 10 00	Existing Conditions Survey		<input checked="" type="checkbox"/>
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50 20 00	Environmental Assessment Information		<input checked="" type="checkbox"/>
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50 30 00	Hazardous Building Materials Inspection and Inventory	210	<input type="checkbox"/>
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50 40 00	Subsurface Geotechnical Report		<input checked="" type="checkbox"/>
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50 50 00	Elevator Agreement		<input checked="" type="checkbox"/>
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50 60 00	FM Global Checklist For Roofing Systems		<input checked="" type="checkbox"/>
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50 70 00	Statement of Special Inspections		<input checked="" type="checkbox"/>
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50 80 00	Additional Info:		<input checked="" type="checkbox"/>
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	50 80 00.1		<input checked="" type="checkbox"/>
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	50 80 00.2		<input checked="" type="checkbox"/>
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	50 80 00.3		<input checked="" type="checkbox"/>
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00 01 10 Table Of Contents

List of Drawing Sheets	
Sheet No.	Title
	COVER SHEET
CU101	PARTIAL SITE PLAN
ME100	MECHANICAL & ELECTRICAL PLAN – GROUND FLOOR
ME101	MECHANICAL & ELECTRICAL PLAN – FIRST FLOOR
ME102	MECHANICAL & ELECTRICAL PLAN – SECOND FLOOR
ME400	MECHANICAL ROOM – GROUND FLOOR
ME400A	MECHANICAL ROOM – GROUND FLOOR – AC-2 NEW WORK
ME401	MECHANICAL ROOM – FIRST FLOOR
ME402	MECHANICAL ROOM – SECOND FLOOR
ME403	MECHANICAL ROOM – THIRD FLOOR
ME404	MECHANICAL ROOM – FOURTH FLOOR
ME405	MECHANICAL ROOM – FIFTH FLOOR
ME406	MECHANICAL ROOM – SIXTH FLOOR
ME407	MECHANICAL ROOM – SEVENTH FLOOR
ME408	MECHANICAL ROOM – EIGHTH FLOOR
ME409	MECHANICAL ROOF PLAN
ME501	HOT WATER HEATING SYSTEM - SCHEMATIC RISER DIAGRAM
ME502	AIR HANDLING UNIT CONTROL DIAGRAMS
ME503	AIR HANDLING UNIT CONTROL DIAGRAMS
ME504	HOT WATER HEATING SYSTEM CONTROL DIAGRAM
ME505	HOT WATER AND AIR HANDLER CONTROL DIAGRAM
ME506	DETAILS
ME507	DETAILS
ME601	MECHANICAL SCHEDULES
ME602	DCS DOCUMENTS

**End of Section
00 01 15 List of Drawing Sheets**



Advertisement No.:	19-15	Advertisement Date:	May 24, 2019
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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>
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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;">JULY</td> <td style="text-align: center;">10</td> <td style="text-align: center;">2019</td> </tr> <tr> <td style="text-align: center;"><i>(Month)</i></td> <td style="text-align: center;"><i>(Day)</i></td> <td style="text-align: center;"><i>(Year)</i></td> </tr> </table>	JULY	10	2019	<i>(Month)</i>	<i>(Day)</i>	<i>(Year)</i>	Time:	<table border="1" style="display: inline-table;"> <tr> <td style="text-align: center;">1:00</td> <td style="text-align: center;">PM</td> </tr> <tr> <td style="text-align: center;"><i>(ET)</i></td> <td></td> </tr> </table>	1:00	PM	<i>(ET)</i>	
JULY	10	2019											
<i>(Month)</i>	<i>(Day)</i>	<i>(Year)</i>											
1:00	PM												
<i>(ET)</i>													

This Invitation to Bid is for the following Project:

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.		
Project Title:	Energy Upgrades -Greater Bridgeport Community Health Center		
Project Location:	1635 Central Avenue Bridgeport, CT		
Project Number:	BI-MH-111 (Rebid)		
Project Description:	Energy-related upgrades within an existing building consisting of approximately 122,000 gross square feet. Installation of new gas connection, new hydronic heating system, additional mechanical room sprinkler heads, fan motor replacements and building management system upgrades are included in this project. See section 1.3.L for additional details		
Work Includes But Is Not Limited To The Following:	Fossil-Fuel Based Space Heating Equipment, New Sprinklers, New Gas Meter and Gas Service, HVAC Control System Improvements, Fan Motor Replacements		
Date DAS Began Planning Project:	08/02/2012		
Special Requirements:	N/A		
Cost Estimate Range:	\$ 1,060,200.	To	\$ 1,171,800.
Date Plans & Specs Ready:	May 29, 2019		
Plans and Specs Download:	Plans and Specs are available for electronic download on the DAS State Contracting Portal.		



Advertisement No.:	19-15	Advertisement Date:	May 24, 2019
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Invitation to Bid (continued)

Contract Time Allowed:	Calendar Days:	365
Liquidated Damages:	\$ 1,064.00	Per Calendar Day Beyond Substantial Completion.
	\$ 881.00	Per Calendar Day Beyond 90 days After Substantial Completion
Pre-Bid Meeting Date:	June 4, 2019	
	<input type="checkbox"/>	Bidders are strongly encouraged to attend the Pre-Bid Meeting.
	<input checked="" type="checkbox"/>	Bidders are required to attend a MANDATORY Pre-Bid Meeting.
Pre-Bid Meeting Time:	1:00	<input type="checkbox"/> AM <input checked="" type="checkbox"/> PM
Pre-Bid Meeting Location:	Greater Bridgeport Community Mental Health Center, 1635 Central Avenue, Bridgeport, CT – Report to the security desk for directions to the meeting room. Please be aware there is no parking available on site, you will have to find parking on the surrounding streets. Please allow extra time for this.	
Pre-Bid Meeting Contact:	DAS/CS Project Manager:	Daniel Wagoner
	Phone No.:	860.713.5614
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.	
Subcontractor and/or Supplier Small Business Enterprise (SBE) & Minority Business Enterprise (MBE) Set-Aside Requirements:	See 00 41 00 Bid Proposal Form	
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. 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.	



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To access Executive Orders: Go to www.ct.gov > Governor Ned Lamont > Executive Orders.

Invitation to Bid (continued)

Important Notices:

UPDATED DOCUMENTS:

Many **Division 00** and **Division 01** documents have been updated. Read all of the contents of the Project Manual *carefully!*

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!**

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 01 11 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 publication, "**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 CT 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.



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Invitation to Bid (continued)

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.
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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:	Fuss & O'Neill, Inc.	Email:	jthurber@fando.com
Construction Administrator:	Jennifer Thurber, PE	Email:	jthurber@fando.com
DAS/CS Project Manager:	Daniel Wagoner	Email:	Daniel.Wagoner@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
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Instructions to Bidders

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

1.0 General Bid Proposal Information

1.1 On-Line Bidding:

1.1.1 The Department of Administrative Services (DAS) Construction Services (CS) has streamlined the Bid process by allowing contractors to submit their **Bid Package Documents on line** through the **State Contracting Portal** and **BizNet**. Rather than submitting paper Bid Package Documents, contractors simply respond to an **Invitation to Bid** on the **State Contracting Portal** by retrieving and uploading their documents electronically through their **BizNet** account. Once completed, the Bid Proposal must be **electronically signed 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**.

1.1.2 All Bidders shall **electronically** upload their **Bid Package Documents** to BizNet following the **instructions** in the DAS/CS publication, [6001 Construction On-line Bidding Instructions](#), available for download here: Go to the DAS Homepage (www.ct.gov/DAS), Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series > **6001 Construction On Line Bidding Instructions**. For questions, call 860-713-5794.

1.2 Bid Opening:

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

1.3 Withdrawal of Bid:

Any **Bid** once uploaded into BizNet cannot be deleted. A Bid may only be **withdrawn** by uploading a written **Letter of Withdrawal** to BizNet using the "**Other Solicitation Document**" link **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. See the **Sales and Use Tax Exemption for Purchases by Qualifying Governmental Agencies (CERT-134)**, available for download from the DRS website (www.ct.gov/drs) under "Exemption Certificates".

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.	
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 BizNet: <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 the Named Subcontractors on the Bid Proposal Form; .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 BizNet. All pages of the Bid Proposal Form <i>must</i> be uploaded to BizNet 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 <i>not</i> 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: Prior to the Pre-Bid Meeting , download the " Security Background Questionnaire " from the CT DOC website (www.ct.gov/doc under " Forms "), 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.

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 fourteen (14) Calendar Days prior</i> 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 DAS Homepage (www.ct.gov/DAS) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 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 DAS Homepage (www.ct.gov/DAS) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series > Scroll down to locate documents.

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 CT DOL Labor Market Areas (LMA) go to the CT DOL website http://www.ctdol.state.ct.us/ , 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 BizNet, 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.

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 the State Contracting Portal.
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 the State Contracting Portal.
2.4.6	Contractors who have subscribed through BizNet to receive daily e-mail alert notices when new Bids/RFPs are issued will be notified via a daily CT DAS " Connecticut Procurement Portal Daily Notice ".
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 BizNet prior to the date and time of the Bid Opening. See BizNet 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 Biznet <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 <u>complete</u> , <u>sign</u> and <u>upload</u> either the " DAS Prequalification Certificate " or " DAS Update (Bid) Statement " to Biznet 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 Section 00 40 15 CT DAS Prequalification Forms 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.

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 any 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 dollar amounts of their subcontracts. The contractor shall be selected on the basis of such bids.
2.7.2	The Named Subcontractor Bid Price shall be the price set forth in the space 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 a Named Subcontractor's price 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 may cause rejection of the bid.
.2	Instructions for downloading " DAS Contractor Prequalification Certificates " and " DAS Update (Bid) Statement " can be found in Section 00 40 15 CT DAS Prequalification Forms .
.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 .

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	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.
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 BizNet prior to the date and time of the Bid Opening.
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 CHRO Employment Information Form, " Bidder Contract Compliance Monitoring Report " <i>with</i> their Bid Proposal Form prior to the date and time of the Bid Opening. The report is posted 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 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 Commission on Human Rights (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) > Small and Minority Businesses > Apply for Small Business Enterprise or Minority Business Enterprise Certification (SBE or MBE) > View/Search SBE/MBE 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 Biznet 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 BizNet 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 BizNet 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 BizNet **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 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 BizNet 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 BizNet 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 BizNet **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 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. For a **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), then 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 BizNet 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 BizNet 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 BizNet **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 BizNet prior to the date and time of the Bid Opening.
- .2 Once uploaded, an updated **Nondiscrimination Certification** shall be 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 DAS Homepage (www.ct.gov/DAS) > Doing Business with the State > Create a BizNet Account for Doing Business with the State > Documents/Forms > Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online.

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 either a Certified Check or a Bid Bond , in the form required by the awarding authority. See Section 00 43 16 Standard Bid Bond in BizNet 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 Biznet 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.

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 BizNet prior to the date and time of the Bid Opening. See BizNet 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 CT Department of Correction (CT DOC) Facilities:	
3.4.1	All Bidders for Projects at a CT DOC Facility shall read and comply with Section 00 73 63 CT DOC Security Requirements for Contract Forces on CT DOC Facilities.
3.4.2	NEW: All Bidders for Projects at a CT DOC Facility: Prior to the Pre-Bid Meeting, all Bidders shall download the “ Security Background Questionnaire ” from the CT DOC website (www.ct.gov/doc), under “Forms”, 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.
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</i> and <i>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</i> and <i>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 CT Department of Labor (CT DOL) within fifteen (15) calendar days after receipt of the “Request for the <i>Affirmative Action Plan</i> and <i>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 NEW PROCESS: 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 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 For instructions on how to download "**SEEC Form 10**", go to the SEEC Homepage (www.ct.gov/seec); click on "Forms" at the top of the page; click on "Contractor Reporting Forms"; click on "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 NEW PROCESS: Contractor and Subcontractor Payments Reporting: Successful Bidder

3.13.1 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 publication, "**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.

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) Every contract to which the state or any political subdivision of the state other than a municipality is a party 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, 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 insure 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, 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;
 - (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 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 and 46a-68f; 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, the contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.

- (c) (1) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at less than fifty thousand dollars for each year of the contract shall provide the state or such political subdivision of the state 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 state or such political subdivision not later than thirty days after such change.
- (2) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at fifty thousand dollars or more for any year of the contract shall provide the state or such political subdivision of the state 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 agency of the state or such political subdivision, 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) Neither the state nor any political subdivision 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 state or a political subdivision of the state, whichever is earlier. Such contractor shall also certify, in accordance with subparagraph (B) or (C) of subdivision (2) of this subsection, to the state or political subdivision, 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 state or political subdivision 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, (2) a quasi-public agency, as defined in section 1-120, (3) any other state, as defined in section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in subparagraph (1), (2), (3), (4) or (5) 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 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, 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 such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. 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, 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) Every contract to which the state or any political subdivision of the state other than a municipality is a party 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) (1) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at less than fifty thousand dollars for each year of the contract shall provide the state or such political subdivision of the state 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 the state or a political subdivision of the state that is valued at fifty thousand dollars or more for any year of the contract shall provide the state or such political subdivision of the state 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 agency of the state or such political subdivision, 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) Neither the state nor any political subdivision 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 state or a political subdivision of the state, whichever is earlier. Such contractor shall also certify, in accordance with subparagraph (B) or (C) of subdivision (2) of this subsection, to the state or political subdivision, 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 state or political subdivision is current and accurate.
- 4) 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 (A) a political subdivision of the state, including, but not limited to, a municipality, (B) a quasi-public agency, as defined in section 1-120, (C) any other state, as defined in section 1-267, (D) the federal government, (E) a foreign government, or (F) an agency of a subdivision, agency, state or government described in subparagraph (A), (B), (C), (D) or (E) of this subdivision.

(c) 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 such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. 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, 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 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	Bidder Questions:	
1.3.1	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.	

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	Procurement and Contracting Requirements:	
2.1.1	Section 00 11 16 – Invitation to Bid	
2.1.2	Section 00 21 13 – Instructions to Bidders	
2.1.3	Section 00 41 00 – Bid Proposal Form	
2.1.4	Section 00 41 10 – Bid Package Submittal Requirements	
2.1.5	Section 00 30 00 – General Statements for Available information	
2.1.6	Division 50 – Project-Specific Available Information	
2.1.7	Bonding	
2.1.8	Insurance	
2.1.9	Bid Security	
2.1.10	Notice of Award	

2.0 Pre-Bid Meeting Agenda (continued):

2.2	Communication During Bidding Period:
2.2.1	Obtaining Bid Documents
2.2.2	Access to DAS Website, BizNet, and State Contracting Portal
2.2.3	Bidder's Requests for Information: See General Requirements Sections 01 26 00
2.2.4	Substitution Procedures (Prior to Bid): See General Requirements Section 01 25 00
2.2.5	Substitutions following Contract Award: See General Requirements Section 01 25 00
2.2.6	Addenda Procedures: See Item No. 2.8 of this form
2.3	Contract Considerations:
2.3.1	Allowances: See General Requirements Section 01 20 00
2.3.2	Unit Prices: See General Requirements Section 01 20 00
2.3.3	Supplemental Bid: See General Requirements Section 01 23 13
2.4	Construction Documents:
2.4.1	Summary of Work: See General Requirements Section 01 11 00
2.4.2	Temporary Facilities and Controls: See General Requirements Section 01 50 00
2.4.3	Work Sequence: See General Requirements Section 01 11 00
2.4.4	Contractor Use of Premises: See General Requirements Section 01 11 00
2.5	Separate Contracts:
2.5.1	Work by Owner
2.5.2	Work of Other Contracts
2.6	Project Schedule:
2.6.1	Project Schedule
2.6.2	Contract Time
2.6.3	Liquidated Damages
2.6.4	Other Bidder Questions
2.7	Site/Facility Visit or Walkthrough:
2.7.1	<input type="checkbox"/> A Site/Facility Visit or Walkthrough is scheduled for the Pre-Bid Meeting
2.7.2	<input type="checkbox"/> A Site/Facility Visit or Walkthrough is <u>NOT</u> scheduled for the Pre-Bid Meeting
2.8	Post Pre-Bid Meeting Addendum:
2.8.1	<u>No Interpretations</u> 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, <i>if</i> issued, will be posted on the State Contracting Portal.

3.0 Pre-Bid Meeting Minutes:

3.1 Recording and Distribution of Pre-Bid Meeting Minutes:

- 3.1.1 The **Owner** 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.

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 checked="" type="checkbox"/>
00 30 30	General Statement for Hazardous Building Materials Inspection and Inventory	<input type="checkbox"/>
00 30 40	General Statement for Subsurface Geotechnical Report	<input checked="" type="checkbox"/>
00 30 50	General Statement for Elevator Agreement	<input checked="" type="checkbox"/>
00 30 60	General Statement for FM Global Checklist for Roofing Systems	<input checked="" type="checkbox"/>
00 30 70	General Statement for "Statement of Special Inspections"	<input checked="" type="checkbox"/>
00 30 80	General Statement for Additional Information	<input checked="" type="checkbox"/>

00 30 10	GENERAL STATEMENT FOR EXISTING CONDITIONS SURVEY	Not Used <input checked="" type="checkbox"/>
00 30 20	GENERAL STATEMENT FOR ENVIRONMENTAL ASSESSMENT INFORMATION	Not Used <input checked="" type="checkbox"/>
00 30 30	GENERAL STATEMENT FOR HAZARDOUS BUILDING MATERIALS INSPECTION AND INVENTORY	Not Used <input type="checkbox"/>
<p>A. Related Documents:</p> <ul style="list-style-type: none">• Section 01 20 00 Contract Considerations• Section 01 35 16 Alteration Project Procedures <p>B. Description of Work:</p> <p>1. Work Involving Asbestos Containing Material (ACM):</p> <p>1.1 Testing for asbestos has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the asbestos testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections.</p> <p>1.2 Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of asbestos. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.</p> <p>2. Work Involving Lead-Based Paint (LBP):</p> <p>2.1 If this facility was constructed prior to 1978 it is likely to have painted surfaces containing lead-based paint (LBP).</p> <p>2.2 Testing for lead-based paint has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the LBP testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of LBP.</p> <p>2.3 The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.</p>		
00 30 40	GENERAL STATEMENT FOR SUBSURFACE GEOTECHNICAL REPORT	Not Used <input checked="" type="checkbox"/>
00 30 50	GENERAL STATEMENT FOR ELEVATOR AGREEMENT	Not Used <input checked="" type="checkbox"/>
00 30 60	GENERAL STATEMENT FOR FM GLOBAL CHECKLIST FOR ROOFING SYSTEMS	Not Used <input checked="" type="checkbox"/>
00 30 70	GENERAL STATEMENT FOR "STATEMENT OF SPECIAL INSPECTIONS"	Not Used <input checked="" type="checkbox"/>
00 30 80	GENERAL STATEMENT FOR ADDITIONAL INFORMATION	Not Used <input checked="" type="checkbox"/>

00 30 00 General Statements for Available Information

Certificate (of Authority)	
DAS Construction Services Project No.:	
I <input style="width: 300px; height: 20px;" type="text"/>	<input style="width: 400px; height: 20px;" type="text"/>
<i>(Signer's Name)¹</i>	<i>(Signer's Title)</i>
of <input style="width: 300px; height: 20px;" type="text"/>	, an entity lawfully organized and existing under the laws
<i>(Name of Entity)</i>	
of <input style="width: 300px; height: 20px;" type="text"/>	, do hereby certify that the following is a true and correct
<i>(Name of State or Commonwealth)</i>	
copy of a resolution adopted on the <input style="width: 50px; height: 20px;" type="text"/> day of <input style="width: 50px; height: 20px;" type="text"/>	, 20 <input style="width: 50px; height: 20px;" type="text"/> by the governing body of
<i>(Day)²</i>	<i>(Month)²</i> <i>(Year)²</i>
<input style="width: 300px; height: 20px;" type="text"/>	, in accordance with all of its documents of governance and
<i>(Name Of Entity)</i>	
management and the laws of <input style="width: 250px; height: 20px;" type="text"/>	and further certify that such resolution has not
<i>(Name of State or Commonwealth)</i>	
been modified, rescinded or revoked, and is at present in full force and effect.	
RESOLVED: that <input style="width: 250px; height: 20px;" type="text"/>	<input style="width: 250px; height: 20px;" type="text"/>
<i>(Name of Signer of Contract Documents)³</i>	<i>(Title of Signer of Contract Documents)³</i>
of <input style="width: 300px; height: 20px;" type="text"/>	is empowered and authorized, on behalf of the entity,
<i>(Name of Entity)</i>	
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 <input style="width: 50px; height: 20px;" type="text"/> day of <input style="width: 50px; height: 20px;" type="text"/>	
<i>(Day)⁴</i>	<i>(Month)⁴</i> <i>(Year)⁴</i>
<input style="width: 350px; height: 20px;" type="text"/>	
<i>(Signature)</i>	
<input style="width: 350px; height: 20px;" type="text"/>	<input style="width: 350px; height: 20px;" type="text"/>
<i>(Print Name)</i>	<i>(Title)</i>

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 BizNet.

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 Forms

IMPORTANT INFORMATION – PLEASE READ
For Projects with estimated Construction Costs greater than \$500,000

WHEN YOU SUBMIT A BID YOU MUST INCLUDE WITH YOUR OTHER DOCUMENTS THE FOLLOWING:

1. A copy of your “DAS Contractor Prequalification Certificate”.

This document may be found at the [DAS Contractor Prequalification Search](#):

Go to the DAS Homepage (www.ct.gov/DAS), click on “Doing Business with the State”, click on “Apply for DAS Construction Contractor Prequalification”, click on “How To”, and then click on “Search Prequalified Companies”.

To search for your company, just type in your company name and click on “Go” to pull up your company. When your company information appears you will notice that your company name is shown as a blue link. Just click on this link and it will take you to your Prequalification Certificate.

2. A “DAS Update (Bid) Statement”.

This document may be found and completed on-line at the [Bid Statement Online Application](#).

Go to the DAS Homepage (www.ct.gov/DAS), click on “Doing Business with the State”, click on “Apply for DAS Construction Contractor Prequalification”, click on “Documents/Forms”, click on “Update Bid Statement”, and then click on “Bid Statements”.

Follow instructions in the “[Instructions for Prequalification](#)”.

Go to the DAS Homepage (www.ct.gov/DAS), click on “Doing Business with the State”, click on “Apply for DAS Construction Contractor Prequalification”, click on “How To”, and then click on “View Instructions for Prequalification”.

Should you have any questions or concerns, please call (860) 713-5280.

State of Connecticut
Department of Administrative Services (DAS) Contractor Prequalification
Update Bid Statement
 (Statement to be included with the bid)

Public Act No. 04-141 - AN ACT REVISING PREQUALIFICATION REQUIREMENTS FOR STATE CONSTRUCTION CONTRACTS.

On and after October 1, 2004, each bid submitted for a contract shall include a copy of a prequalification certificate issued by the Commissioner of Administrative Services. The bid shall also be accompanied by an update statement in such form as the Commissioner of Administrative Services prescribes. The form for such update statement shall provide space for information regarding all projects completed by the bidder since the date the bidder's prequalification certificate was issued or renewed, all projects the bidder currently has under contract, including the percentage of work on such projects not completed, the names and qualifications of the personnel who will have supervisory responsibility for the performance of the contract, any significant changes in the bidder's financial position or corporate structure since the date the certificate was issued or renewed, any change in the contractor's qualification status, and such other relevant information as the Commissioner of Administrative Services prescribes. Any bid submitted without a copy of the prequalification certificate and an update statement shall be invalid.

Name of Project that company	SAMPLE	
Project Number:		
Name of Company:		
FEIN:		
Company Address:		
Prequalification Contact and Telephone Number		
Date of Prequalification with the DAS:	Single Limit:	Aggregate Work Capacity (AWC):
* This amount equals your company's AWC minus the Total \$ Amount of Work Remaining.		* Remaining Aggregate Work Capacity:

Please list all of your company's (100%) completed projects since date of Prequalification:
 (Please add additional page(s) if required)

Name of Project	Owner of Project	Date Project Completed	Total Contract Amount

(Please add additional page(s) if required. Please total the Work Remaining column)

Name of Project	Owner of Project	Total Contract Amount	% Complete	Work Remaining (\$)
Total \$ Amount of Work Remaining →				

Please list the names and titles of the personnel who will have supervisory responsibility for the performance of the contract being bid on:
(Please add additional page(s) if required)

Individual Name	Individual
	

Have there been any other business organizations, which might affect your company's ability to successfully complete this contract?

Yes or No

If yes, please explain:

I, certify under penalty of law that all of the information contained in this Update Statement is true and accurate to the best of my knowledge as of the date below.

Signature

Date

It is the responsibility of the Awarding Authority to determine if any of the information provided above will impact the contractor's performance on this project.

The DAS' Contractor Prequalification Program can be reached at (860) 713-5280

Rev.12.22.2004

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 On-Line Bidding:	Follow the instructions in 6001 Construction On-line Bidding Instructions , available for download from the DAS/CS Library (http://portal.ct.gov/DASCSLibrary) > 6000 Series – Bid Phase Forms. For questions, call 860-713-5794 or 860-713-5783.

- 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 BizNet.
 - **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.
 - Upload to BizNet **only** the additional **Bid Package Documents** 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 Biznet **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:

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%
Project Title:	Energy Upgrades – Greater Bridgeport Community Mental Health Center
Project Location:	1635 Central Avenue Bridgeport, CT
Project Number:	BI-MM-111
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:	Fuss & O’Neill, Inc., 146 Hartford Road, Manchester, CT 06040

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 \$

1,064.00

 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 \$

881.00

 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.

1.4.4 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, *if* 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: NOT APPLICABLE		
ADD: \$	<input style="width: 100%;" type="text"/> <i>(Insert Numerical Figures)</i>	<input style="width: 100%;" type="text"/> <i>(Insert "Printed Words" Dollar Amount)</i>
		Dollars
Supplemental Bid No. 2: NOT APPLICABLE		
ADD: \$	<input style="width: 100%;" type="text"/> <i>(Insert Numerical Figures)</i>	<input style="width: 100%;" type="text"/> <i>(Insert "Printed Words" Dollar Amount)</i>
		Dollars
Supplemental Bid No. 3: NOT APPLICABLE		
ADD: \$	<input style="width: 100%;" type="text"/> <i>(Insert Numerical Figures)</i>	<input style="width: 100%;" type="text"/> <i>(Insert "Printed Words" Dollar Amount)</i>
		Dollars
Supplemental Bid No. 4: NOT APPLICABLE		
ADD: \$	<input style="width: 100%;" type="text"/> <i>(Insert Numerical Figures)</i>	<input style="width: 100%;" type="text"/> <i>(Insert "Printed Words" Dollar Amount)</i>
		Dollars

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 BizNet for a template and instructions. Complete and upload **Section 00 45 14 General Contractor Bidder's Qualification Statement** to Biznet **prior** 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 Bidder's Prequalification Requirements for Projects Exceeding \$500,000:

All Bidders for Projects with estimated Construction Costs greater than \$500,000: Upload to BizNet 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** **prior** 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**. See **Section 00 40 15 CT DAS Prequalification Forms** for instructions on preparing and/or downloading your Firm's "**DAS Contractor Prequalification Certificate**" and "**DAS Update (Bid) Statement**".

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 type="checkbox"/>	Electrical Work: NOT APPLICABLE Complete Subcontractor Name: _____ Proposed Dollar Value of Subcontract: \$ _____
<input checked="" type="checkbox"/>	HVAC Work: Enter information in blue boxes below: Complete Subcontractor Name: _____ Proposed Dollar Value of Subcontract: \$ _____
<input type="checkbox"/>	Masonry Work: NOT APPLICABLE Complete Subcontractor Name: _____ Proposed Dollar Value of Subcontract: \$ _____
<input type="checkbox"/>	Plumbing Work: NOT APPLICABLE Complete Subcontractor Name: _____ Proposed Dollar Value of Subcontract: \$ _____
<input type="checkbox"/>	Environmental Remediation: NOT APPLICABLE Complete Subcontractor Name: _____ Proposed Dollar Value of Subcontract: \$ _____
<input type="checkbox"/>	Hazardous Materials Abatement: NOT APPLICABLE Complete Subcontractor Name: _____ Proposed Dollar Value of Subcontract: \$ _____

- 2.7.2 Instructions For Table 2.7:**
- .1 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 When a box is checked in **Table 2.7**, the Bidder shall insert the name of the Subcontractor with the **largest** proposed Subcontract Value; this is known as the **“Named Subcontractor”**. The Bidder shall provide all of the information for each **checked Class of Work**.
 - .3 If a **Bidder** intends to use a **Subcontractor** to perform **any portion** of the Named **Classes of Work**, including circumstances where the Subcontractor is a Small Business Enterprise (SBE) or a Minority Business Enterprise (MBE), *then* it must list the Subcontractor or SBE/MBE Subcontractor as the case may be, for such Class of Work. A **Bidder** may **not** substitute itself for any of the Named Classes of Work. The Bidder **should not list itself** as the **Named Subcontractor** if it intends to use a **Subcontractor** to perform any portion of the Classes of Work listed in **Table 2.7**. The Bidder should name the Subcontractor.
 - .4 For each **Class of Work** specified in **Table 2.7**, the Bidder shall list the **Subcontractor** with the **largest Proposed Dollar Value of Subcontract** for each Class of Work as the **Named Subcontractor** and the **Proposed Dollar Value** of its Subcontract. If the Bidder intends to use **more than one** Subcontractor to perform a Class of Work, then it shall indicate the Subcontractor Name and Subcontract Value for the **largest** single Named Subcontractor.
 - .5 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.
 - .6 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)**.
 - .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.

2.8 Set Aside Requirements: (see Section 00 73 38 "CHRO Contract Compliance Regulations")

2.8.1 For Projects Less Than \$500,000: Submit a current copy of your Firm's "DAS Set-Aside Certificate" *with* your Bid Proposal Form *prior* 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" *with* your Bid Proposal Form *prior* 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 Special Hazards Insurance:

None is Required.

"X-C-U" Coverage (explosion, collapse, and underground damage) **shall be required** in accordance with **Article 35 Contractors Insurance of Section 00 73 13 General Conditions**.

Asbestos Abatement Insurance is required.

2.9.2 Builders Risk Insurance:

None is Required.

The Bidder **shall be required to 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 and the policy shall state that the State of Connecticut shall be named as a loss payee not as an additional insured for these coverages.

2.9.3 Commercial General Liability Insurance:

NOTE: There is a new requirement regarding **commercial general liability (CGL) insurance:** All selected firms are required to provide an endorsement to the CGL insurance stating that the State of Connecticut is an additional insured. Please be advised that a blanket endorsement **may not** be acceptable.

2.9.4 Owners and Contractors Protective Liability Insurance:

The Bidder shall maintain **Owner's and Contractor's Protective Liability** 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.

2.9.5 Umbrella Liability Insurance:

This project requires **Umbrella Liability Insurance**. The Bidder shall provide an endorsement to the Umbrella Liability Insurance stating that the State of Connecticut is an additional insured. Select the correct **Umbrella Limit** for this **Project's Contract Value** using the "Umbrella Liability Insurance Table" below.

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

3.0 Bid Proposal Acknowledgements:

The Bidder *acknowledges and agrees* to the following:

3.1 To Upload to BizNet Submit the Bid Proposal Form (all pages), All Other Bid Documents, Affidavits, and Certifications:

3.1.1 The Bidder acknowledges and agrees to electronically upload to DAS BizNet 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:

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.

3.6 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.

3.7 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 BizNet for a template and instructions.

3.0 Bid Proposal Acknowledgements (continued):**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 Facilities:

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

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:
(Month) (Day) (Year)

Bidder's Signature:
(Duly Authorized) (Title)

(Print Named) (Date)

Bid Package Submittal Requirements:

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

1.1	On-Line Bidding:
1.1.1	All Bidders shall electronically upload their Bid Package Documents to BizNet following the instructions in the DAS/CS publication, 6001 Construction On-line Bidding Instructions , available for download here: Go to the DAS Homepage (www.ct.gov/DAS) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series > 6001 Construction On Line Bidding Instructions .
1.1.2	For questions, call 860-713-5794.

1.2	Bid Package Submittal Requirements:
All Bidders are required to electronically upload Bid Package Documents to BizNet <i>prior</i> to the date and time of the Bid Opening. Additional documents must be either electronically uploaded to BizNet or submitted as paper copies to the appropriate Agency . See Tables 1, 2, and 3 for specific submittal requirements.	
1.2.1	All Bidders: See Table 1. All Documents in Table 1 <u>must be electronically uploaded to BizNet.</u>
1.2.2	Three (3) Apparent Lowest Bidders: See Table 2.
1.2.3	Apparent Low Bidder: See Table 3.

1.3	Deadlines for Receipt of Bid Package Documents:
1.3.1	Table 1: Bid Package Documents must be uploaded to BizNet <i>prior</i> to the date and time of the Bid Opening. 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 <u>complete, sign and upload</u> to BizNet 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 .
1.3.2	Tables 2 and 3: See the tables for additional deadlines. Failure to submit the documents before the stated deadlines may result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services.

1.4	Delays in Receipt of Supportive Documents from the Three Apparent Lowest Bidders:		
1.4.1	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 style="margin-left: 20px; border: none;"> <tr> <td style="width: 20px;">.1</td> <td>For example, since the Three (3) 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 (3) 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 (3) 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 .		
1.4.2	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.		

TABLE 1 ALL BIDDERS			
Construction Costs:		The Bid Proposal Form, Other Bid Package Documents, Affidavits, and Certifications <u>shall</u> be electronically uploaded to BizNet 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	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	* Section 00 43 16 Standard Bid Bond or Certified Check	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	* Section 00 45 14 General Contractor Bidder's Qualification Statement	BizNet
	<input checked="" type="checkbox"/>	* DAS Prequalification Certificate	BizNet
	<input checked="" type="checkbox"/>	* DAS Update (Bid) Statement	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Section 00 40 14 Certificate (of authority)	BizNet
<input checked="" type="checkbox"/>		DAS Set-Aside Certificate	BizNet
<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	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	* Consulting Agreement Affidavit – OPM Ethics Form 5	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> *	Ethics Affidavit (Regarding State Ethics) – OPM Ethics Form 6	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> *	Iran Certification – OPM Ethics Form 7	BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Nondiscrimination Certification – Form A, B, C, D, or E	BizNet

*** 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 BizNet 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 within ten (10) Calendar Days <i>after</i> 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.	Download from BizNet
	<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.	Download from BizNet

TABLE 3 APPARENT LOW BIDDER			
Construction Costs:		When Applicable, submit the following documents as noted:	Form Location
Less Than \$500,000	Greater Than \$500,000		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	If Contractor has 50 or more employees and/or the Project is equal to or greater than \$500,000, submit to CHRO: Affirmative Action Plan and Employment Information Form (DAS-45).	CHRO Website & BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Submit to DAS/CS Procurement Unit: Copy of 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 CT 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

Submit within fifteen (15) calendar days <i>after</i> 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"/>	If Contractor has 50 or more employees and/or the Project is equal to or greater than \$500,000, submit to CHRO: Affirmative Action Plan and Employment Information Form (DAS-45).	CHRO Website & BizNet
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Submit to DAS/CS Procurement Unit: Copy of 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 CT 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 within ten (10) business days <i>after</i> 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: <u>Verified Nonresident</u> General/Prime Contractors must submit a copy of their “ Notice of Verified Status ” (Verification Letter) from the CT Department of Revenue Services (DRS). <u>Unverified Nonresident</u> 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"/>	NEW: 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	BizNet
<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"/>	NEW: Contractor and Subcontractor Payments Reporting: Every Contractor (and its Subcontractors) shall log on to BizNet each month and enter payments they have received from the state, from the Contractor, or from a higher tier Subcontractor (as applicable).	BizNet

End of Section
 00 41 10 Bid Package Submittal Requirements

INSTRUCTIONS FOR CERTIFIED CHECK OR BID BOND (select one):
All Bidders:
Edit this page, print, sign, and scan to PDF. Upload the PDF form to BizNet.

- 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 Biznet; 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 Biznet.

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

<input style="width: 90%; height: 20px;" type="text"/>		<input style="width: 90%; height: 20px;" type="text"/>
<i>(Principal's Signature)</i>		Surety
<input style="width: 90%; height: 20px;" type="text"/>	by	<input style="width: 90%; height: 20px;" type="text"/>
<i>(Print Name)</i>		Its attorney in fact Signature
<input style="width: 90%; height: 20px;" type="text"/>		<input style="width: 90%; height: 20px;" type="text"/>
Company Name		<i>(Print Name)</i>

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 BizNet**, 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 BizNet **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

2.5 **CPS Projects ONLY: Insert Class of Work**

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.

<input type="checkbox"/>	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.

<input type="checkbox"/>	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 **NEW:** 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 **NEW:** 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. Signature

Dated at

Signed this

 day of , 20

Name of Firm:

Firm Address:

Signature:

Print or Type Name:

Title:

25. 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.

The **Objective Criteria Established for Evaluating Qualifications of Bidders** (Section 00 45 15) 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 **exceed** those in **Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders**.

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 BizNet 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 BizNet **Section 00 45 14 General Contractor's Bidder Qualifications Statement** *prior* 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 **after** receipt of the "Set-Aside Contractor Schedule Request" *from* 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; fulfilment 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.

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:		
		(Name)	(Phone Number)
12.13	Design Firm:		
12.14	Design Firm's Representative:		
		(Name)	(Phone Number)
12.15	General Contractor:		
12.16	G.C.'s Representative:		
		(Name)	(Phone Number)

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. Signature

Dated at

Signed this day of , 20

Name of Firm:

Firm Address:

(Signature)

(Print or Type Name)

(Title)

19. 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

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, and 4b-3, as revised, and (herein called the “Contractor”).

(Print Name of Contractor)

WITNESSETH, that 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."

IN WITNESS WHEREOF, 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.

Attested By:		State Of Connecticut	
WITNESS: <input type="text"/>	<i>(Signature)</i>	By: <input type="text"/>	<i>(Signature)</i>
Print Name: <input type="text"/>		Print Name: Josh Geballe	
WITNESS: <input type="text"/>	<i>(Signature)</i>	Its: Commissioner	
Print Name: <input type="text"/>		Department of Administrative Services	
		Date Signed: <input type="text"/>	
			<div style="border: 1px solid black; width: 100%; height: 100%;"></div>
			SEAL
WITNESS: <input type="text"/>	<i>(Signature)</i>	Contractor: <input type="text"/>	
Print Name: <input type="text"/>		By: <input type="text"/>	<i>(Signature)</i>
WITNESS: <input type="text"/>	<i>(Signature)</i>	Its: <input type="text"/>	, Duly Authorized
Print Name: <input type="text"/>		Print Name: <input type="text"/>	
		Date Signed: <input type="text"/>	

**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.

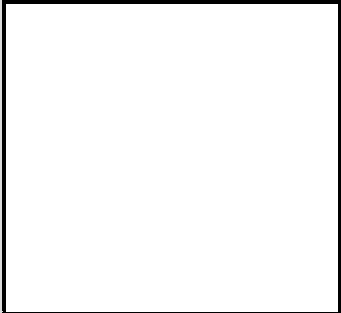
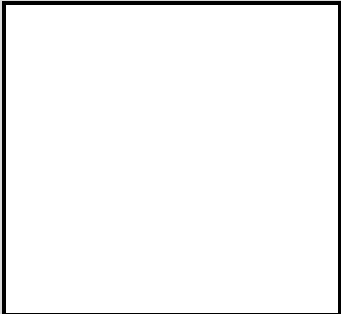
2. The Contractor agrees to begin, prosecute and complete the entire work specified by the Awarding Authority in an orderly manner so that the Subcontractor will be able to begin, prosecute and complete the work described in this subcontract; and, in consideration thereof, upon notice from the Contractor, 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	CONTACT NAME:	
	PHONE (A.C. No. Ext):	FAX (A.C. No.):
INSURED Contractor's Legal Name and Address	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A:	NAIC#
	INSURER B:	
	INSURER C:	
	INSURER E:	

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 SUBR INSR WORD	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-WIDE <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 - COMPYOP 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) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N 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 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

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

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.

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. Should this Contract be for a Construction Services

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 Subcontractor'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 be deducted **seven** and **one-half** percent (7.5%) of the amount of each Application for Payment to be retained by the Owner as Retainage until Final Completion.

28.2.1 The Commissioner has the sole discretion in the determination of reduction in Retainage. At fifty percent (50%) completion of the Work the Owner shall issue a "Contractor's Performance Evaluation". If the Contractor receives a performance evaluation score of "Good" or better, then the Retainage withheld may be reduced to five percent (5%). All subsequent Applications for Payment shall be subject to five percent (5%) Retainage. Upon Substantial Completion, the Retainage may be reduced at the request of the Contractor and recommendation of the CT DCS 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 CT DCS Project Manager's estimate of the remaining Work or two and one-half percent (2.5%), which ever is greater. All requests for Retainage Reduction shall be done on CT DCS Form 7048 General Contractor Retainage Reduction Request, which can be found at the end of the General Conditions.

28.2.2 Subsequent to Substantial Completion, in limited circumstances, at the sole discretion of the Commissioner, a reduction of Retainage below Two and one-half 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.

28.3.2.11 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 Document 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 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 Notwithstanding any provision or language in the

Contract to the contrary, the State may terminate the Contract 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 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 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 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 40 13 BID PROPOSAL FORM, subsections 4.4.2 and 4.4.3, 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 Bidding and Contracts Unit, Department of Construction Services, 165 Capitol Avenue, Room G-35, Hartford, CT 06106 unless otherwise directed in

writing. Presented below is a narrative summary of the insurance required.

35.1.1 Commercial General Liability 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 Construction 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 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 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 Excess Liability (Other than Umbrella Form) insurance in the amount of \$5,000,000 for bids of \$1,000,000 - \$10,000,000 and in the amount of \$10,000,000 for bids of \$10,000,001 - \$20,000,000. Refer to Section 00 92 00 Amendments of the Project Manual for Excess Liability insurance requirements for bids exceeding \$20,000,000.

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. Longshoremen's and Harbor Workers Act.

35.1.6 Special Hazards Insurance, if required, will be stated in SECTION 00 40 13 BID PROPOSAL FORM, subsection 4.4.2 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 Section 00 40 13 Bid Proposal Form, subsection 4.4.3 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 Hold Harmless Provisions: The Contractor shall at all times indemnify and save harmless the State of Connecticut, the Department of Construction Services, and their respective officers, agents, and employees, on account of any and all claims, damages, losses, litigation, expenses, counsel fees and compensation arising out of injuries (including death) sustained by or alleged to have been sustained by the officers, agents, and employees of said State or Department, or of the Contractor, his Subcontractor, or materialmen and from injuries (including death) sustained by or alleged to have been sustained by the public, any or all persons on or near the Work, or by any other person or property, real or personal (including property of said State or Department) caused in whole or in part by the acts, omissions, or neglect or the Contractor including, but not limited to, any neglect in safeguarding the Work or through the use of unacceptable materials in constructing the Work of the Contractor, any Subcontractor, materialman, or anyone directly employed by them or any of them while engaged in the performance of the Contract, including the entire elapsed time from the date of the Notice to Proceed or the actual Commencement Of The Work whichever occurs first until its completion as certified by the Department of Construction Services.

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.

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** 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. 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.

END

Appendix 1



7048
General Contractor
Retainage Reduction Request
(SAMPLE)

To: Allen V. Herring, P.E., CT DCS Chief Engineer
Room 265, 165 Capitol Avenue, Hartford, CT 06106

From: (Insert GC's Name), General Contractor

Subject: Project No. () Reduction of Retainage at ()% project completion

In accordance with the General Conditions, Article 28 Progress Payments, (insert GC's name) hereby requests a reduction of retainage to an amount of insert written percent Percent (insert numerical percent%). 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.

- DAS Contractor Performance Evaluation Score is a minimum of **Sixty (60%) Percent**.
- Timely submission of an appropriate and complete CPM Schedule and 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 Contract Document required submissions: including but not limited to Shop Drawings, material certificates and material samples and the prompt resolution of the Owner's and/or Architect's or Engineer's comments on the submitted material resulting in an appropriate progress of the Work.
- Proper and adequate supervision and home 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 credit Change Orders have been invoiced.
- All Change Order requests for pricing are current.
- The General Contractor has and is maintaining a clean worksite in accordance with the Contract Documents.
- All Subcontractor payments are current at the time of reduction request.
- General Contractor is compliant with set-aside provisions of the contract.

General Contractor Certification: _____
(Written Name) (Signature) (Date)

Project Manager Recommendation: _____
(Written Name) (Signature) (Date)

Approved:
Allen V. Herring, P.E.
CT DCS Chief Engineer

(Signature) (Date)

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

1.0 SUPPLEMENTARY CONDITIONS:

1.1 These Supplementary Conditions modify the State of Connecticut, Department of Administrative Services/ Construction Services, Section 00 72 13 General Conditions of the Contract for Construction for Design-Bid-Build (Rev. 03.26.12), and other provisions of the Contract Documents as indicated below. All provisions which are not so modified remain in full force and effect.

1.2 The terms used in these Supplementary Conditions which are defined in the Section 00 72 13 General Conditions of the Contract for Construction for Design-Bid-Build (Rev. 03.26.12), have the meanings assigned to them in the General Conditions.

2.0 ARTICLE 1 DEFINITIONS in Section 00 72 13 General Conditions:

2.1. DELETE: Section **1.71** in its entirety.

ADD: Section **1.71** as follows:

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".

2.2. ADD: Section **1.72** as follows:

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.

3.0 ARTICLE 3 CORRELATION OF CONTRACT DOCUMENTS in Section 00 72 13 General Conditions:

3.1 ADD: Section **3.6** as follows:

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.

4.0 ARTICLE 28 PARTIAL PAYMENTS in Section 00 72 13 General Conditions:

4.1 DELETE: Section **28.2** in its entirety.

ADD: Section **28.2** as follows:

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 **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%).

5.0 ARTICLE 35 CONTRACTOR'S INSURANCE in Section 00 72 13 General Conditions:

5.1 DELETE: Section 35.1 in its entirety.

ADD: Section 35.1 as follows:

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. Longshoremen's 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.

5.2 DELETE: Section 35.6 in its entirety.

ADD: Section 35.6 as follows:

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.

6.0 ARTICLE 36 FOREIGN MATERIALS in Section 00 72 13 General Conditions:

6.1 ADD: Section **36.3** as follows:

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).

7.0 ADD: ARTICLE 40 DISCLOSURE OF RECORDS in Section 00 72 13 General Conditions as follows:

7.1 ADD: Section **40.1** as follows:

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.

8.0 ADD: ARTICLE 41 AUDIT AND INSPECTION OF PLANTS, PLACES OF BUSINESS, AND RECORDS in Section 00 72 13 General Conditions as follows:

8.1 ADD: Sections **41.1 through 41.7** as follows:

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.

9.0 APPENDIX 1 in Section 00 72 13 General Conditions:

- 9.1 DELETE: Appendix 1 in its entirety.
 ADD: Appendix 1 as follows:

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 Payment, hereby requests a reduction of retainage from % to %.

The following list of items required under the General Conditions 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 Sixty (60%) Percent.
- Timely submission of an appropriate and complete CPM Schedule and 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 Document submissions including but not limited to Shop Drawings, material submittals, 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 home 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 credit Change Orders have been invoiced.
- All Change Order requests for pricing are current.
- The GC has and 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 set-aside provisions of the contract.

General Contractor Certification:

Project Manager Recommendation:

DAS Chief Architect or Authorized Representative:

END

END OF SECTION

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 2.9 "Set-Aside Requirements" of Section 00 21 13 Instructions to Bidders**, you are required to *list* below 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.**

Name	Address	* Amount	Indicate Whether: Subcontractor, Or Supplier, Or Both	** Class of Work
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE

***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.

ATTACHMENTS:

For Each of the Named Subcontractors:

- Attach their Section 00 45 17 Named Subcontractor Bidders Qualification Statement(s)

For Each of the Named Set-Aside SBE/MBE Contractors:

- Attach their DAS Set-Aside Certificate of Eligibility (SBE and/or MBE)

For Each of the Named Subcontractors With Subcontracts Greater Than \$500,000:

- Attach their DAS Prequalification Certificate and Update (Bid) Statement for the Class of Work

 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:

**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).

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.

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.

Section 5

Set-Aside Program:

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.

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.

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.

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

**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-MH-111	Project Town:	Bridgeport, CT
Project: Energy Upgrades – Greater Bridgeport Community Mental Health Center			
1635 Central Avenue			
Bridgeport, 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	15 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: May 28, 2019



Opportunity * Guidance * Support



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.

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

**Minimum Rates and Classifications
for Building Construction**

ID# : B 26139

**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-MH-111

Project Town: Bridgeport

State#:

FAP#:

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

CLASSIFICATION	Hourly Rate	Benefits
1a) Asbestos Worker/Insulator (Includes application of insulating materials, protective coverings, coatings, & finishes to all types of mechanical systems; application of firestopping material for wall openings & penetrations in walls, floors, ceilings	38.25	27.96
<hr/>		
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**		
<hr/>		
1c) Asbestos Worker/Heat and Frost Insulator	40.21	29.30

As of: **Tuesday, May 28, 2019**

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

2) Boilermaker	38.34	26.01
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3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	34.72	32.55 + a
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3b) Tile Setter	34.90	25.87
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3c) Terrazzo Mechanics and Marble Setters	31.69	22.35
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3d) Tile, Marble & Terrazzo Finishers	26.70	21.75
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3e) Plasterer	33.48	32.06
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As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

-----LABORERS-----

4) Group 1: Laborers (common or general), acetylene burners, concrete specialists, wrecking laborers, fire watchers.	30.75	20.84
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4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofers/mixer/nozzlemans (Person running mixer and spraying fireproof only).	30.30	20.10
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4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	31.25	20.84
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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 whose primary task is to actually perform the mating of pipe sections) P6 and P7 rate is \$26.80.	30.55	20.10
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4d) Group 5: Air track operator, sand blaster and hydraulic drills.	30.55	20.10
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As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

4e) Group 6: Blasters, nuclear and toxic waste removal. 31.80 20.10

4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped). 31.05 20.10

4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew. 28.38 20.10

4h) Group 9: Top men on open air caisson, cylindrical work and boring crew. 27.86 20.10

4i) Group 10: Traffic Control Signalman 16.00 20.10

5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Vinyl Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers. 33.53 25.66

As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

5a) Millwrights	34.04	26.09
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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)	38.82	26.25+3% of gross wage
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7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	53.37	33.705+a+b
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-----LINE CONSTRUCTION-----

Groundman	26.50	6.5% + 9.00
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Linemen/Cable Splicer	48.19	6.5% + 22.00
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As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

8) Glazier (Trade License required: FG-1,2) 37.18 21.05 + a

9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection 35.47 35.14 + 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) 40.97 24.80 + 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) 40.64 24.80 + 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) 39.88 24.80 + a

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper).	39.48	24.80 + a
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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" Mandrell)	38.87	24.80 + a
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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine.	38.87	24.80 + a
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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	38.55	24.80 + a
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Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrell).	38.20	24.80 + a
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Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	37.79	24.80 + a
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Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

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). 37.34 24.80 + a

Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc. 35.24 24.80 + a

Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment. 35.24 24.80 + a

Group 12: Wellpoint operator. 35.18 24.80 + a

Group 13: Compressor battery operator. 34.58 24.80 + a

Group 14: Elevator operator; tow motor operator (solid tire no rough terrain). 33.41 24.80 + a

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. 32.99 24.80 + a

Group 16: Maintenance Engineer/Oiler. 32.32 24.80 + a

Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator. 36.76 24.80 + a

Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license). 34.26 24.80 + a

-----PAINTERS (Including Drywall Finishing)-----

10a) Brush and Roller 33.62 21.05

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

10b) Taping Only/Drywall Finishing	34.37	21.05
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10c) Paperhanger and Red Label	34.12	21.05
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10e) Blast and Spray	36.62	21.05
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11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	42.62	31.21
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12) Well Digger, Pile Testing Machine	37.26	24.05 + a
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Roofer: Cole Tar Pitch	41.50	17.00 + a
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As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	40.00	17.00 + a
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15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	43.70	42.40
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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)	42.62	31.21
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-----TRUCK DRIVERS-----

17a) 2 Axle	29.13	23.33 + a
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17b) 3 Axle, 2 Axle Ready Mix	29.23	23.33 + a
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As of: **Tuesday, May 28, 2019**

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

17c) 3 Axle Ready Mix	29.28	23.33 + a
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17d) 4 Axle, Heavy Duty Trailer up to 40 tons	29.33	23.33 + a
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17e) 4 Axle Ready Mix	29.38	23.33 + a
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17f) Heavy Duty Trailer (40 Tons and Over)	29.58	23.33 + a
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17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	29.38	23.33 + a
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18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	43.92	15.84 + a
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As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

19) Theatrical Stage Journeyman	25.76	7.34
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Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

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.

As of: Tuesday, May 28, 2019

Project: Energy Upgrades For The Greater Bridgeport Community Mental Health Center

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.

~~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.

As of: Tuesday, May 28, 2019

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.

***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 _____ 4) Disability _____
- 2) Pension or retirement _____ 5) Vacation, holiday _____
- 3) Life Insurance _____ 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)

Additional Forms to Be Submitted After Bond Commission Funding Approval

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

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Labor And Material Bond	2
Surety Sheet	1
Bidder's Certification: Financial Position and Corporate Structure	1

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.

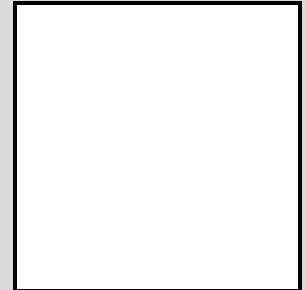
Any alterations which may be made in the terms of the contract, or in the work done or to be done under it, or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal, one to the other, shall not 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)

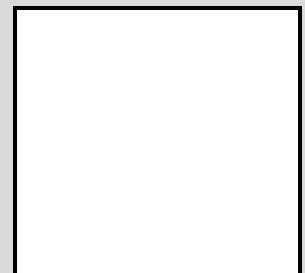
, Its

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.

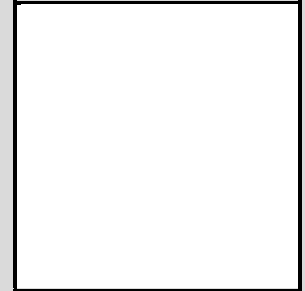
Any alterations which may be made in the terms of the contract, or in the work done or to be done under it, or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal, one to the other, shall not 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)

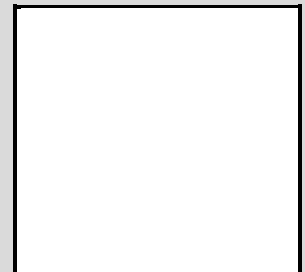
, Its

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-MH-1111**

C. Project Title: **Energy Upgrades - Greater Bridgeport Community Mental Health Center**

D. Project Location: The **Greater Bridgeport Community Mental Health Center**, located in **Bridgeport**, Connecticut.

E. The Project Description:

- 1. Energy-related upgrades within an existing building consisting of approximately **122,000** gross square feet. Installation of a new gas connection, new hydronic heating system, additional mechanical room sprinkler heads, fan motor replacements and building management system upgrades are included in this project. See Section 1.3.L for additional details.
- 2. 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: **Daniel Wagoner****
 - 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: **860-713-5614****
 - c. **Fax: **959-200-4865****
 - d. **Email(s): **Daniel.Wagoner@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 DAS/Div Construction Services.
 2. **Agency Representative Name and Title:** **Daniel Wagoner**. The Agency Representative's Title is **Associate Project Manager**.
 - a. **Agency Representative Location:** The Agency Representative is located at **450 Columbus Blvd. Suite1201, Hartford, CT**.
 - b. **Phone:** **860-713-5614**
 - c. **Fax:** **959-200-4865**
 - d. **Email(s):** **Daniel.Wagoner@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 **Jennifer Thurber, PE**.
 - a. **Architect's Location:** The Architect is located at **146 Hartford Road, Manchester, CT**.
 - b. **Phone:** **860-646-2469** x5538
 - c. **Fax:** **860-645-2044**
 - d. **Email(s):** **jthurber@fando.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:** **Jennifer Thurber, PE**
 - a. **Construction Administrator Location:** The Construction Administrator is located at **146 Hartford Road, Manchester, CT**.
 - b. **Phone:** **860-646-2469**
 - c. **Fax:** **860-645-2044**
 - d. **Email(s):** **jthurber@fando.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):**1. Construction Manager's Name (CMR): N/A**

- a. **Construction Manager's Firm's Location:** The Construction Manager is located at **N/A**
- b. **Phone:** **N/A**
- c. **Fax:** **N/A**
- d. **Email(s):** **N/A**

2. Authority: Construction Manager is under direct Contract with the Department of Administrative 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 Construction Manager.

3. Related Sections:

- a. **Article 1 "Definitions"** of Division 00 "General Conditions of the Contract for Construction for Construction Manager at Risk (CMR)"; and
- b. **Section 2.3 "Construction Phase"** of Article 2 "Construction Manager At Risk Responsibilities", in Section 00 52 23 "Standard Form of Agreement Between Owner and Construction Manager-At-Risk (CMR) For Guaranteed Maximum Price (GMP)".

K. Reporting and Contracting Requirements for Contractor and Subcontractor Payments:

1. For compliance with **C.G.S. Sec. 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).
2. 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.
3. 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.
4. Detailed instructions can be found in the DAS/CS publication, **"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.

L. Work: The Work Includes but is not limited to the following:

- 1 **Fossil-Fuel-Based Space Heating Equipment:** Six new condensing-gas boilers will be installed in three mechanical rooms as part of a new hot water heating loop to offset electrical heating requirements within the building's occupied spaces. These boilers will heat water to be used in new hot water coils to be located in existing air handling units located on each floor. New duplex pumps will be installed near the boilers to circulate water as required during the heating season.
- 2 **New Sprinklers:** New sprinklers will be installed in mechanical rooms that contain the new condensing gas boilers.
- 3 **New Gas Meter:** A new gas line, with new gas meter, will be installed to feed the new condensing boilers. This gas line will extend from the meter to the 8th floor. The utility will provide materials and installation from the new connection at the street up to and including the new meter.
- 4 **HVAC Control System Improvements:** New space temperature sensors will be installed as part of a DDC system upgrade. Pneumatic lines will be cleaned and calibrated, and the air supply controls will be refurbished to provide 15 psig in the occupied cycle and 20 psig in the unoccupied cycle. New regulators and other air-supply equipment will be provided, as well as servicing of existing air compressors.
- 5 **Fan Motor Replacements:** Existing fan motors for each zone's supply and return fans will be replaced with higher efficiency motors.

- 6 Asbestos Remediation:** Asbestos will be remediated, as necessary, at wall and floor penetration locations for the above work to be completed. Wall and floor penetrations are required for new gas and hydronic piping installation.
- M. 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.
- N. 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.
- O. The Work will be constructed under the Contractor's Contract as applicable to this Project.

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 1 Phase. Work of this Phase) shall be substantially complete, ready for occupancy within 360 Calendar Days of commencement of the Work (the "**Contract Time**").
- C. This Phase shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. Work of this Phase shall be substantially complete, ready for occupancy within 360 Calendar Days of commencement of the Work. The intent of this Phase includes but is not limited to the following:
1. **Pre-construction balancing measurements.**
 2. **Gas-Fired Condensing Boilers and hydronic pipe distribution and pumps.**
 3. **Installation of new hot water coils in fan rooms.**
 4. **DDC Control System Upgrade – Installation of new space temperature sensors and other work that does not impact cooling.**
 5. **Premium-Efficiency Motors for AHU Supply and Return Fans**

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 facility.
 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 loading dock from Mead Street. The Contractor shall check all roadways 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.
- C. Use of the Existing Building:** Maintain the existing building in a weather-tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period. Note: Check with Agency special types of conditions. Contractor personnel are not allowed to use the Cafeteria or vending machines within the existing buildings unless authorized in writing by the agency.

1.8 OCCUPANCY REQUIREMENTS

- A. Full Agency Occupancy During Construction:** The Owner reserves the right to allow the Agency to occupy the site and existing building during the entire construction period. Cooperate with the Agency during construction operations to minimize conflicts and facilitate Agency usage. Perform the Work so as not to interfere with the Agency's operations.
1. Provide adequate building and fire code egress from the buildings during the renovation process and/or as indicated on the Contract Documents. The Contractor will be responsible to maintain and protect egress ways during the construction sequence as required and/or indicated in the Contract documents. The Contractor shall be responsible for preparing egress plans for Owner approval and for DAS/CS Office of State Building Official and Office of State Fire Marshal for approval if required.

1.9 PRODUCTS ORDERED IN ADVANCE

- A. General:** The Owner has negotiated purchase orders with suppliers of material and equipment to be incorporated into the Work. The Owner has assigned these purchase orders to the Contractor. Costs for receiving handling and storage, and installation are included in the contract sum.
1. The Contractor's responsibilities are the same as if the contractor negotiated the purchase orders. If necessary, the Contractor shall renegotiate purchase and execute final purchase-order agreements.
 2. A "Schedule of Products Ordered in Advance" is included at the end of this section.

1.10 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.
3. If tests have been done for Asbestos Containing Material (ACM), Lead-Based Paint (LBP) Containing Material, Polychlorinated Biphenyls (PCBs) in Building Materials and/or Mold, then the results are referenced in [Section 00 30 00 Available Information and provided in Division 50 00 00 Project-Specific Available Information](#). See [Division 01 Section 01 35 16 "Alteration Project Procedures"](#) for **removal responsibility** and additional information.

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. **phasing requirements;**
 - b. **proposed vehicle and equipment access routes;**
 - c. **locations of proposed staging/lay-down and storage areas, utility connections;**
 - d. **utilization of maintaining at least one elevator in use at all times;**
 - e. **occupant access to the elevator during construction;**
 - f. **delivery access of materials, handicap access;**
 - g. **building egress, proposed pedestrian traffic flows in the interior and exterior of the building;**
 - h. **temporary access-ways;**
 - i. **office trailer and dumpster locations;**
 - j. **location of perimeter construction fencing and gates;**
 - k. **other protection measures around and in the building(s);**
 - l. **temporary partitions, proposed pedestrian traffic flows around and in each building;**
 - m. **proposed building access points;**
 - n. **proposed protection measures for trees, shrubs and plantings, interior access-ways;**
 - o. **coordination of activities that relate to building occupants and other field applied measure to protect and coordinate the work including any relocation of utilities.**
- 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 **5** sets of the Contract Documents on or about the time of execution of the Contract, free of charge. 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) Floor Plans 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 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

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 35 16 Alteration Project Procedures

Section 01 35 29 Environmental Health and Safety

Section 01 57 13 Temporary Erosion and Sediment Control

Section 01 77 00 Closeout Procedures

Section 02 41 16 Structure Demolition

Section 02 41 19 Selective Demolition for Hazardous Materials

Section 02 50 00 Demolition and Alterations

Section 02 61 13 Handling of Regulated Soil

Section 02 61 23 Removal and Disposal of PCB Contaminated Soils

Section 02 80 00 Contaminated Materials Excavation, Staging, Loading, Transportation, and Disposal

Section 02 81 00 Transportation and Disposal of Regulated Soil

Section 02 82 00 Asbestos Remediation

Section 02 82 13 Asbestos Abatement

Section 02 82 13.33 Asbestos Containing Roofing Material Abatement

Section 02 83 00 Lead Remediation Specifications

Section 02 84 16 Removal and Handling of Regulated Material

Section 02 84 33 Removal and Disposal of PCBs.

Section 02 85 00 Mold and Other Hazardous Materials Remediation Specifications

Section 23 07 00 Thermal Insulation Specifications

Section 23 33 00 Flexible Connections Specifications

Section 31 10 00 Site Clearing

Section 31 20 00 Site Earth Moving

Section 31 20 01 Building Excavation and Backfill

Section 31 23 19 Wastewater Treatment Systems

1.3 ALLOWANCES

- A. This Section includes administrative and procedural requirements for Allowances.

- 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.

- C. **Cash Allowances:**

1. The Contractor's costs for unloading and handling, labor, installation costs, storage, insurance, overhead and profit and other expense related to the Allowance item shall be included in the Lump Sum Bid Amount and not in the Allowance unless stated otherwise in the Allowance Schedule of this section.
2. **Architect/Engineer Responsibilities:**
 - a. Consult with Contractor for consideration of Products, suppliers and installers.
 - b. Select Products in consultation with the DAS/CS Project Manager and Agency Representatives and transmit decision to Construction Administrator.
 - c. Prepare Change Order.
3. **Construction Administrator Responsibilities:**
 - a. Consult with Architect/Engineer, Contractor, DAS/CS Project Manager and Agency Representatives for consideration of Products, suppliers and installers.
 - b. Select Products in consultation with Architect/Engineer, DAS/CS Project Manager and Agency Representatives and transmit decision to Contractor.
 - c. Prepare Change Order.
4. **Contractor Responsibilities:**
 - a. Assist Architect/Engineer and Construction Administrator in selection of Products and Suppliers.
 - b. Obtain proposals from Suppliers and offer recommendations.
 - c. On notification of selection by Construction Administrator execute purchase agreement with designated supplier.
 - d. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - e. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by Change Order.
5. **Allowance Schedule: None.**

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 – Hazardous Building Materials Abatement:

A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and Technical Specifications apply to this Section.

B. Unit Price Schedule – Hazardous Building Materials Abatement:

1.	ASBESTOS ABATEMENT	UNIT	\$ ADD/ DEDUCT
	AR-001 CLEAN-UP OF ACM DEBRIS BY HEPA VACUUMING	SF	\$0.23
	AR-002 REMOVAL OF PIPE INSULATION INCLUDING FITTINGS (FULL CONTAINMENT - < 6" DIA)	LF	\$1.63
	AR-003 REMOVAL OF PIPE INSULATION INCLUDING FITTINGS(FULL CONTAINMENT - 6" - 12" DIA)	LF	\$2.68
	AR-004 REMOVAL OF PIPE INSULATION INCLUDING FITTINGS(FULL CONTAINMENT - >12" DIA)	LF	\$3.65
	AR-005 GLOVE BAG REMOVAL OF PIPE OR FITTING INSULATION (MINI-CONTAINMENT - FIRST 25)	EA	\$26.05
	AR-006 GLOVE BAG REMOVAL OF PIPE OR FITTING INSULATION (MINI-CONTAINMENT - QUANTITY BETWEEN 25-50)	EA	\$20.56
	AR-007 GLOVE BAG REMOVAL OF PIPE OR FITTING INSULATION (MINI-CONTAINMENT - QUANTITY IN EXCESS OF 50)	EA	\$18.30
	AR-008 REMOVAL OF EQUIPMENT INSULATION	SF	\$3.81
	AR-009 REMOVAL OF HVAC DUCT INSULATION	SF	\$3.81
	AR-010 REMOVAL OF HVAC DUCT SYSTEM FLEXIBLE CONNECTOR	SF	\$2.77
	AR-011 REMOVAL OF RESILIENT FLOORING INCLUDING MASTIC	SF	\$1.05
	AR-012 REMOVAL OF RESILIENT FLOORING (NO MASTIC)	SF	\$0.67
	AR-013 REMOVAL OF SPRAYED ON FIREPROOFING	SF	\$2.61
	AR-014 REMOVAL OF PLASTER CEILING SYSTEM (INCLUDING BLACK IRON AND METAL LATH)	SF	\$2.68
	AR-015 REMOVAL OF ACOUSTIC OR METAL PAN CEILING SYSTEM (INCLUDING GRID)	SF	\$1.74
	AR-016 REMOVAL OF ACOUSTIC CEILING PANELS (CLEAN GRID FOR REUSE)	SF	\$1.45
	AR-017 REMOVAL OF ACOUSTIC PLASTER FINISH MATERIAL (SCRAPE)	SF	\$2.45
	AR-018 PATCH AND/OR SEAL DAMAGED INSULATION	SF	\$1.05
	AR-019 REMOVAL OF CONTAMINATED SOIL (2" DEPTH)	SF	\$1.69
	AR-020 REMOVAL OF TRANSITE MATERIAL	SF	\$0.92
	AR-021 REMOVAL OF ROOFING OR ROOF FLASHING MATERIAL	SF	\$1.34
	AR-022 REMOVAL OF UNDERGROUND PIPE OR PIPE INSULATION (INCLUDING HAND EXCAVATION)	LF	\$10.75
	AR-023 REMOVAL OF CARPET OVER RESILIENT FLOORING	SF	\$0.83
	AR-024 REMOVAL OF WALL BASE AND MASTIC	LF	\$0.95
	AR-025 REMOVAL OF DRYWALL PARTITION (INCLUDING WALL FRAMING)	SF	\$0.90
	AR-026 REMOVAL OF CMU WALL	SF	\$1.82
	AR-027 PREP WORK AREA	SF	\$1.09
	AR-028 SOLID BARRIERS OR ACCESS TUNNELS (2"x4"@16", 1/2" PLYWOOD)	SFSA	\$1.26
	AR-029 SELECTIVE DEMOLITION TO ACCESS CONCEALED ACM	SF	\$1.11
	AR-030 REMOVAL OF FLOOR LEVELING MATERIAL	SF	\$0.79

2.	LEAD-BASED PAINT ABATEMENT		UNIT	\$ ADD/ DEDUCT
	SP-001	REMOVE LOOSE PAINT FROM WALLS OR CEILINGS (WET SCRAPING OR BRUSHING)	SF	\$0.89
	SP-002	STRIP PAINT FROM FLAT SURFACES	SF	\$2.93
	SP-003	STRIP PAINT FROM COLUMNS AND STRUCTURAL FRAMING MEMBERS	SF	\$3.68
	SP-004	STRIP PAINT FROM STAIR TREADS, RISERS AND STRINGERS	SF	\$5.08
	SP-005	STRIP PAINT FROM TRIM	LF	\$2.82
	SP-006	STRIP PAINT FROM DOORS (DOOR OPENING SIZE)	SF	\$4.54
	SP-007	STRIP PAINT FROM WINDOW (WINDOW SIZE)	SF	\$7.08
	SP-008	STRIP PAINT FROM RADIATOR	SF	\$8.75
	SP-009	STRIP PAINT FROM HANDRAIL	LF	\$7.35
	SP-010	STRIP PAINT FROM PIPING	SF	\$6.30
	SP-011	CLEAN-UP OF MATERIALS CONTAINING LEAD (DIRT, BUILDING DEBRIS, ETC.)	CF	\$3.43
	SP-012	HEPA VACUUMING AND WASHING SURFACE (SMOOTH SURFACE)	SF	\$0.63
	SP-013	HEPA VACUUMING AND WASHING SURFACE (POROUS SURFACE)	SF	\$1.05
	SP-014	REMOVE EXTERIOR SOIL (6" DEPTH)	SF	\$4.50

3.	PCBS IN BUILDING MATERIAL ABATEMENT		UNIT	\$ ADD/ DEDUCT
	HM-001	REMOVE LOOSE PCB CONTAMINATED CAULK (WET SCRAPING OR BRUSHING)	LF	\$6.20
	HM-002	REMOVE PCB CONTAMINATED CAULK AND 6 INCHES OF BUILDING MATERIALS	LF	\$28.00
	HM-003	REMOVE PCB CONTAMINATED CAULK AND 12 INCHES OF BUILDING MATERIALS	LF	\$37.00
	HM-004	REMOVE INTACT PCB CONTAMINATED CAULK WITH NO REMOVAL OF BUILDING MATERIALS	LF	\$8.50
	HM-005	STRIP PAINT FROM FLAT SURFACES	SF	\$2.94
	HM-006	HEPA VACUUMING AND WASHING SURFACE (SMOOTH SURFACE)	SF	\$0.60
	HM-007	HEPA VACUUMING AND WASHING SURFACE (POROUS SURFACE)	SF	\$1.05
	HM-008	REMOVE EXTERIOR SOIL (6" DEPTH)	SF	\$4.88
	HM-009	EXCAVATE, TRANSPORT, AND DISPOSE OF PCB CONTAMINATED SOIL (1 TON)	TON	\$400

4.	MOLD ABATEMENT		UNIT	\$ ADD/ DEDUCT
	IAQ-001	CLEANING AND HEPA VACUUMING OF CONTAMINATED COMPONENTS OR MATERIALS	SF	\$0.61
	IAQ-002	REMOVAL OF CONTAMINATED PIPE INSULATION	LF	\$0.61
	IAQ-003	REMOVAL OF CONTAMINATED BUILDING INSULATION	SF	\$0.61
	IAQ-004	REMOVAL OF CONTAMINATED HVAC DUCT OR EQUIPMENT INSULATION	SF	\$0.61
	IAQ-005	REMOVAL OF CONTAMINATED CARPET	SF	\$0.88
	IAQ-006	REMOVAL OF CONTAMINATED DRYWALL PARTITION (INCLUDING WALL FRAMING)	SF	\$1.05
	IAQ-007	REMOVAL OF CONTAMINATED PLASTER	SF	\$1.87
	IAQ-008	REMOVAL OF CONTAMINATED SUSPENDED CEILING PANELS	SF	\$0.59
	IAQ-009	PREP WORK AREA	SF	\$0.99
	IAQ-010	SOLID BARRIERS OR ACCESS TUNNELS (2"x4"@16", 1/2" PLYWOOD)	SFSA	\$2.09
	IAQ-011	SELECTIVE DEMOLITION TO ACCESS CONTAMINATED COMPONENTS OR MATERIALS	SF	\$1.15

5.	REWORK ITEMS DURING ABATEMENT ACTIVITIES		UNIT	\$ ADD/ DEDUCT
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	RW-001	REINSULATE PIPE 1" THICK FIBERGLAS ASJ	SF	\$2.83
	RW-002	REINSULATE PIPE 1 1/2" THICK FIBERGLAS ASJ	SF	\$3.62
	RW-003	REINSULATE PIPE 2" THICK FIBERGLAS ASJ	SF	\$4.30
	RW-004	REINSULATE PIPE FITTING 1" THICK FIBERGLAS ASJ	EA	\$4.37
	RW-005	REINSULATE PIPE FITTING 1 1/2" THICK FIBERGLAS ASJ	EA	\$5.34
	RW-006	REINSULATE PIPE FITTING 2" THICK FIBERGLAS ASJ	EA	\$6.50
	RW-007	REINSULATE MECHANICAL EQUIPMENT 3 PCF, 2" THICK	SF	\$3.50
	RW-008	REINSULATE HVAC DUCT SYSTEM (FLEXIBLE DUCT WRAP) 0.75 PCF, 1 1/2" THICK	SF	\$2.25
	RW-009	REINSULATE HVAC DUCT SYSTEM (RIGID BOARD) 3 PCF, 1 1/2" THICK	SF	\$6.00
	RW-010	REPLACE HVAC DUCT SYSTEM FLEXIBLE CONNECTOR	SF	\$7.83
	RW-011	REPLACE TRIM COMPONENT (WOOD CASING, JAMB, APRON, ETC.)	LF	\$1.26
	RW-012	REPLACE INTERIOR DOOR (SOLID CORE FLUSH OR 6-PANEL PINE)	EA	\$207.50
	RW-013	REPLACE WINDOW (SASH ONLY)	EA	\$207.50
	RW-014	REPLACE WINDOW (COMPLETE UNIT INCLUDING FRAME)	EA	\$375.00
	RW-015	PAINT FLAT SURFACES (PRIMER + FINISH COAT)	SF	\$0.27
	RW-016	PAINT COLUMNS AND STRUCTURAL FRAMING MEMBERS (PRIMER + FINISH COAT)	SF	\$2.89
	RW-017	PAINT STAIR TREADS, RISERS AND STRINGERS (PRIMER + FINISH COAT)	SF	\$2.89
	RW-018	PAINT HANDRAIL (PRIMER + FINISH COAT)	LF	\$0.27
	RW-019	PAINT TRIM COMPONENT (CASING, JAMB, APRON, ETC., PRIMER + FINISH COAT)	LF	\$0.83
	RW-020	PAINT DOORS (DOOR OPENING SIZE - INCLUDES BOTH FACES PRIMER + FINISH COAT)	SF	\$1.67
	RW-021	PAINT WINDOW (INCLUDES INTERIOR & EXTERIOR PRIMER + FINISH COAT)	SF	\$1.97
	RW-022	PAINT RADIATOR (PRIMER + FINISH COAT)	SF	\$2.97
	RW-023	PAINT PIPING (PRIMER + FINISH COAT)	LF	\$0.29
	RW-024	REPLACE EXTERIOR SOIL (6" LOAM AND SEED)	SF	\$7.19
	RW-025	ASPHALT PAVING	SF	\$3.43

6.	MISCELLANEOUS ABATEMENT ITEMS		UNIT	\$ ADD/ DEDUCT
	MI-001	MOBILIZATION (1 PER WORK AREA)	EA	\$262.50
	MI-002	WORKER DECON (1 PER WORK AREA)	EA	\$262.50
	MI-003	CONTAINMENT BARRIERS TO SEPARATE THE WORK AREA (SOFT BARRIER)	SF	\$1.02
	MI-004	CONTAINMENT BARRIERS TO SEPARATE THE WORK AREA (HARD BARRIER)	SF	\$2.55
	MI-005	TEMP ELECTRICAL CONNECTION (LICENSED ELECTRICIAN)	EA	\$450.00
	MI-006	TEMP ELECTRICAL GENERATOR	DY	\$375.00
	MI-007	DISPOSAL OF ACM WASTE (INCLUDES TRANSPORTATION)	CY	\$60.00
	MI-008	DISPOSAL OF HAZARDOUS WASTE MATERIAL (INCLUDES TRANSPORTATION)	TON	\$380.00
	MI-009	DISPOSAL OF CONSTRUCTION DEBRIS (INCLUDES TRANSPORTATION)	TON	\$30.00
	MI-010	ABATEMENT SUPERVISOR (LICENSED)	HR	\$81.00
	MI-011	STAND-BY ABATEMENT PERSONNEL (EACH LICENSED WORKER)	HR	\$74.00
	MI-012	ENCAPSULATION UTILIZING LIQUID COATING SYSTEM	SF	\$0.69
	MI-013	ENCAPSULATION UTILIZING HEAVY BODIED REINFORCED COATING SYSTEM	SF	\$1.03
	MI-014	FIXED SCAFFOLDING	SF	\$16.00
	MI-015	EXCAVATION TO EXPOSE UNDERGROUND PIPE	CY	\$25.00
	MI-016	PROJECT NOTIFICATION AND FEES	EA	\$0.00
	MI-017	PROJECT BOND (3% OF CONTRACT)	EA	\$0.00

7.	COMPONENT REPLACEMENT DURING ABATEMENT ACTIVITIES		UNIT	\$ ADD/ DEDUCT
	CR-001	REMOVE TRIM COMPONENT (CASING, BASE, APRON, ETC.)	LF	\$0.49

	CR-002	REMOVE DOOR (DOOR ONLY)	SF	\$0.27
	CR-003	REMOVE DOOR (INCLUDING JAMB, NO TRIM)	SF	\$0.61
	CR-004	REMOVE WINDOW (SASH ONLY)	SF	\$0.40
	CR-005	REMOVE WINDOW (COMPLETE UNIT INCLUDING FRAME)	SF	\$0.92
	CR-006	REMOVE RADIATOR	SF	\$0.77
	CR-007	REMOVE MISCELLANEOUS ITEM	CF	\$7.56

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 20 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 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

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: None.

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 16.13 "CPM Schedules" for requirements for CPM 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 requirement 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

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 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 16.13):** a lump sum payment upon receipt of the base line schedule. A payment of 40% of the total amount of the total cost which is to be calculated at 1/8th of one percent of the base bid total project cost. Monthly updates using the remainder of the cost divided evenly over the accepted schedule duration with a forfeit of the monthly payment of the update is not received on time.
Any forfeited amounts being withheld by the CA for non-performance will be adjusted at the final payment by a credit change order to the owner.
- 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

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 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-Built - 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

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 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 45 00 "Precast Architectural Concrete" for pre-installation/erection conferences.
6. Division 07 Section 07 50 00 "Membrane 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 updating of the Contractor's construction schedules and reporting progress of the Work.
1. Refer to the General Conditions and the Agreement for definitions and specific dates of Contract Time.
- B. This Section includes the following:
1. Format.
 2. Content.
 3. Revisions to schedules.
 4. Submittals.
 5. Distribution.
- C. **Related Sections:** The following Sections contain requirements that relate to this Section:
1. Division 01 Section 01 29 76 "Progress Payment Procedures" specifies requirements for submitting Schedule of Values and Application for Payments.
 2. Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submitting and distributing meeting and conference minutes.
 3. Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submitting the Submittal Schedule.
 4. Division 01 Section 01 45 00 "Quality Control" specifies requirements for submitting inspection and test reports.
 5. Division 01 Section 01 60 00 "Product Requirements" specifies requirements for submitting the list of products.

1.3 DEFINITIONS

- A. **Construction Schedule:** A method of planning and scheduling a construction project utilizing 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.

1.4 QUALITY ASSURANCE

- A. **The Contractor's Consultant:** Retain a consultant to provide planning, evaluating, and reporting by CPM scheduling.
1. **In-House Option:** The Owner may waive the requirement to retain a consultant if the Contractor can demonstrate that:
 - a. The Contractor has the computer equipment required to produce construction schedules.
 - b. The Contractor employs skilled personnel with experience in construction scheduling and reporting techniques.
 2. **Program:** Use **Microsoft Project** latest version.
 3. **Standards:** Comply with procedures contained in AGC's "Construction Planning & Scheduling."

1.5 PRELIMINARY SCHEDULE

- A. Preliminary Gantt schedule is to be prepared by the Contractor and submitted to the Construction Administrator within **seven (7)** days of award of contract. This schedule is to cover all items of Work from the start of the project up to the completion of the project. This schedule must be revised when the actual schedule of significant items varies more than one week from the proposed schedule.

1.6 CONSTRUCTION SCHEDULE FORMAT

1. **Format:** Utilize a horizontal bar chart (Gantt) with a separate bar for each major portion of the Work or operation, identifying first work day of each week.
2. **Program:** Use **Microsoft Project**, latest version.
3. **Sequence of Listings:** Utilize the Table of Contents of this Project Manual and the chronological order of the start of each item of work.
4. **Scale and Spacing:** Provide space for notations and revisions.
5. **Sheet Size:** To be coordinated with Construction Administrator.
6. **Weather Days Allowance:** The Contractor shall include as a separate identifiable activity on the Critical Path of the Construction Schedule, and activity labeled "Weather Days Allowance." Insert this activity immediately prior to the substantial completion milestone.

6.1 The Contractor shall be fully responsible for determining the number of weather delay days to be included in the Construction Schedule. This determination shall be based on the normal anticipated weather for the project location and the nature of the project work. The Construction Schedule shall be based on the contractor's determined weather delay allowance. The weather delay activity shall be included in the construction schedule immediately prior to the Substantial Completion milestone.

6.2 The minimal allowed duration of the Weather Days Allowance shall be calculated as follows (decimals rounded to nearest whole number):

$$\frac{\text{Contract Time (Calendar Days)}}{365} \text{ multiplied by } 7 \text{ equals Weather Days Allowance (Calendar Days)}$$

6.3 The Contractor shall insert an activity in the Critical Path of the Construction Schedule to reflect weather day occurrences when weather days are experienced and accepted by the Owner. Identify this activity as a weather delay.

6.4 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.

1.7 CONTENT

- A. Show complete sequence of construction by activity, with dates beginning and completion of each element of construction.
- B. Identify each item by specification section numbers.
- C. Identify work of separate phases and other logically grouped activities.
- D. Show accumulated percentages of completion of each item, and total percentage of Work completed, as of the **first** day of each month.
- E. Provide separate schedule of submittal dates for shop drawings, product data, and samples, Owner/Agency furnished products and any products identified as under Allowances, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.
- F. Indicate delivery dates for Owner/Agency furnished products and any products identified as under Allowances.
- G. Indicate critical path with original baseline indicated.
- H. Coordinate content with Schedule of Values specified in Section 01 29 76 "Progress Payment Procedures."

1.8 SUBMITTALS AND REVISIONS TO SCHEDULES

- A. An initial bar graph schedule is to be prepared by the Contractor and submitted to the Construction Administrator. Refer to Article 1.5.
- B. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- C. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
- D. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

- E. Schedules must be revised monthly and when the actual schedule of significant items varies more than **seven (7) days** from the proposed schedule.
- F. Submit revised Construction Schedules for each Application for Payment.
- G. Submit **four (4)** copies of the Construction Schedule to the Construction Administrator.

1.9 DISTRIBUTION

- A. Distribute copies of the Construction 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

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 Project Schedules" for requirements for 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 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 and Construction Manager reserve** 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 **Construction Manager'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. **Construction Manager** 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. 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 administrative and procedural requirements for performing alteration and renovation Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 00 Section 00 30 00 "General Statements for Available Information" for information that is available in addition to the Bidding Documents for review by bidders. Such information may include an existing conditions survey, contaminated soil reports, contaminated groundwater reports, hazardous building material reports, geotechnical data, etc.
 2. Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating cutting and patching with other construction activities.
 3. Division 01 Section 01 73 29 "Cutting and Patching" for procedures for cutting and patching.
 4. Division 01 Section 01 74 19 "Construction Waste Management & Disposal" for the requirements for waste management goals, waste management plan and waste management plan implementation.
 5. Division 02 Section 02 41 19 "Selective Structure Demolition" for demolition of selected portions of the building for alterations.
 6. Division 02 Section 02 42 93 "Building Deconstruction" for deconstruction of selected portions of the building for alterations.
 7. Division 50 00 00 "Project-Specific Available Information" for information that is referenced in Section 00 30 00 "General Statements for Available Information".
 8. Refer to other Sections for specific requirements and limitations applicable to performing alteration Work with individual parts of the Work.
 9. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 21, 22, 23 and 26 Sections for other requirements and limitations applicable to renovation Work by mechanical and electrical installations.
- C. **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.

PART 2 - PRODUCTS

2.1 PRODUCTS FOR PATCHING AND EXTENDING WORK

- A. **New materials:** As specified in product sections; match existing Products and Work for patching and extending Work.
- B. **Type and Quality of Existing Products:** Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

PART 3 - EXECUTION

3.1 INSPECTION

A. General:

1. Observe all existing conditions prior to submitting a bid. Include in the bid, existing conditions and their impact, particularly to cost and health and safety of workers and occupants, and proper function and operation of the facility. Be aware of other work being performed. Failure to visit the site shall in no way provide relief from the necessity of furnishing materials or performing any work that may be required to complete the work in accordance with the Contract Documents without additional cost to the Owner. All site visits shall be scheduled with the Owner.
2. The quantities, locations and the extent of work indicated are best estimates, which are limited by the physical constraints imposed by occupancy of the facility. Consider all aspects of the substrates within the identified plan area. Material information and quantities were obtained from site surveys. Accordingly, variations (plus or minus 10 percent) in quantities within the limits of the work area are considered as having no impact on contract sum and contract performance period. Where additional abatement work is required beyond the above variations, the contract sum and contract performance period shall be adjusted under provisions of Division 01 of the Specifications.
3. Verify that demolition is complete and areas are ready for installation of new Work.
4. Beginning of restoration Work means acceptance of existing conditions.

B. Project Procedures for Work Involving Asbestos Containing Material (ACM):

1. The **Owner** is responsible for abating all **Asbestos Containing Material (ACM)** that is visible and accessible. This is to be accomplished through a separate project prior to the start of the renovation project.
2. In **demolition projects**, **every attempt** should be made by the **Owner** to **remove all ACM**.
3. If testing for asbestos has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair, then the results of the asbestos testing are summarized in **Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory** at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of asbestos. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.
4. If the Contractor should encounter any material suspected or known to contain asbestos **not previously identified and assigned as the Contractor's responsibility**, then the Contractor should immediately notify the Construction Administrator **in writing** of same. It is the Owner's responsibility to have the material tested and abated (if necessary). The Owner will respond within **twenty four (24) hours** after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. **The Owner will abate ACM (if necessary) within a reasonable time period, i.e. within seven (7) calendar days.**

4.1 When the **Owner** requests the **Contractor** undertake the responsibilities for the **abatement and disposal of the ACM**, then the compensation to the Contractor by Owner for the Work shall be determined by the “**Unit Prices**” stated in **Section 01 20 00 Contract Considerations**.

5. 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 Agreement 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.

C. Project Procedures for Work Involving Lead-Based Paint (LBP):

1. The **Owner** is responsible for abating all **Lead-Based Paint (LBP)** prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
2. The **Owner** shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations as specified in this **Section 01 35 16 Alteration Project Procedures** and as specified in **Section 02 83 00 Lead Remediation**.
3. If testing for LBP has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair, then the results of the LBP testing are summarized in **Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory** at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of LBP. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.
4. If the Contractor should encounter any material suspected or known to contain **LBP that was not previously identified and assigned as the Contractor’s responsibility**, then the Contractor should immediately notify the Construction Administrator **in writing** of same. It is the State’s responsibility to have the material tested and abated (if necessary). The Owner will respond within **four (4) Calendar Days** after receiving the Contractor’s written request to the Construction Administrator for testing the suspect material. **The Owner will abate LBP (if necessary) within a reasonable time period, i.e. within ten (10) calendar days.**

4.1 When the **Owner** requests the **Contractor** undertake the responsibilities for the **abatement and disposal of the LBP**, then the compensation to the Contractor by Owner for the Work shall be determined by the “**Unit Prices**” stated in **Section 01 20 00 Contract Considerations**.

5. Exposure levels for lead in the construction industry are regulated by 29 CFR 1926.62. Construction activities disturbing surfaces containing lead-based paint (LBP) which are likely to be employed, such as sanding, grinding, welding, cutting and burning, have been known to expose workers to levels of lead in excess of the Permissible Exposure Limit (PEL). Conduct demolition and removal Work specified in the technical sections of this specification in conformance with these regulations. In addition, construction debris/waste may be classified as hazardous waste. Disposal of hazardous waste material shall be in accordance with 40 CFR Parts 260 through 271 and Connecticut Hazardous Waste Management Regulations Section 22a-209-1; 22a-209-8(c); 22a-449(c)-11; and 22a-449(c)-100 through 110.
6. The Contractor's Work shall be based on a child under the age of six (6) years in residence; the Work shall also be in accordance with Connecticut Regulations Section 19a-111-1 through 11.
7. If this facility was constructed **prior to 1978** it is likely to have painted surfaces containing lead-based paint.
8. In accordance with the United States Environmental Protection Agency's (EPA) Lead-Based Paint Renovation, Repair, and Painting Program (RRP) issued by the EPA on April 22, 2008, as amended, and regulated by 40 CFR 745, contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities, and schools built before 1978 must be certified and must follow specific work practices to prevent lead contamination. EPA requires that firms performing renovation, repair, and painting projects that disturb lead-based paint in pre-1978 homes, child care facilities and schools be certified by EPA and that they use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices. The Contractor must be a Renovation Firm that has completed an EPA Lead-Safe Certification Program and be certified to conduct lead-based paint activities and renovations under the RRP rule. The Contractor shall have at least one “Certified Renovator” assigned to jobs where LBP is disturbed.

D. Project Procedures for Work Involving Polychlorinated Biphenyls (PCBs) in Building Materials:

1. If this facility was constructed **between 1950 and 1978**, it is likely to have caulk and/or glazing containing PCBs.
2. The **Owner** is responsible for abating all **Polychlorinated Biphenyls (PCBs) in Building Materials** prior to the start of any Work involving construction, renovation or demolition (if necessary), unless noted differently below or specified differently elsewhere.
3. The **Owner** shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations as specified in **Section 01 35 16 Alteration Project Procedures** and as specified in **Section 02 61 23 Removal and Disposal of PCB Contaminated Soils and Section 02 84 33 Removal and Disposal of PCBs**.
4. If the Owner has tested the facility scheduled for renovation, demolition, reconstruction alteration, remodeling or repair for PCBs in Building Materials such as caulk and glazing or other types of material, then the results are located in **Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory** at the end of the Technical Specification Sections; otherwise the Owner assumes such materials do not warrant testing. It is the Owner's responsibility to have the material tested, not the Contractor, subcontractors or anyone working on behalf of the Contractor.
5. In the case where the Owner has a survey of locations with results and if the Contractor should encounter new areas of the subject material already identified by the survey, then he should immediately notify the Construction Administrator **in writing** of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within **four (4) Calendar Days** after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. **The Owner will abate PCBs in Building Materials (if necessary) within a reasonable time period, i.e. within ten (10) calendar days.**
 - 5.1 When the **Owner** requests the **Contractor** undertake the responsibilities **for the abatement and disposal of the PCBs in Building Materials**, then the compensation to the Contractor by Owner for the Work shall be determined by the "**Unit Prices**" stated in **Section 01 20 00 Contract Considerations**.
6. The work shall be performed by persons who are knowledgeable, qualified, and trained in the removal, treatment, handling, and disposal of PCB contaminated wastes and the subsequent cleaning of the affected environment. These Specifications govern all work activities that disturb PCB-containing caulk and glazing and associated building material. All activities shall be performed in accordance with, but not limited to, OSHA Regulation 29 CFR 1926, the United States Environmental Protection Agency's PCB Regulation 40 CFR Part 761, Connecticut General Statutes 22a-463 through -469 inclusive, and the **PCB Site Remedial Plan** where applicable.

E. Project Procedures for Work Involving Mold:

1. The **Owner** is responsible for abating all Mold (any form of fungi, including mold or mildew, and myotoxins, spores, scents or by-products produced or released by fungi) prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
2. The **Owner** shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations as specified in **Section 01 35 16 Alteration Project Procedures** and **Section 02 85 00 Mold and Other Hazardous Materials Remediation Specifications**.
3. If the Owner has tested the facility scheduled for renovation, demolition, reconstruction alteration, remodeling or repair for Mold, then the results are located in **Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory** at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of Mold. It is the Contractor's responsibility to verify all materials and field conditions prior to renovation, demolition, reconstruction, alteration, remodeling, or repair that may affect the performance of their Work.
4. If the Contractor should encounter any material suspected or known to contain **Mold that was not previously identified and assigned as the Contractor's responsibility**, he should immediately notify the Construction Administrator **in writing** of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within **four (4) Calendar Days** after receiving

the Contractor's written request to the Construction Administrator for testing the suspect material. **The Owner will abate Mold (if necessary) within a reasonable time period, i.e. within ten (10) calendar days.**

4.1 When the **Owner** requests the **Contractor** undertake the responsibilities **for the abatement and disposal of Mold**, then the compensation to the Contractor by Owner for the Work shall be determined by the "**Unit Prices**" stated in **Section 01 20 00 Contract Considerations**.

5. Disposal of all hazardous materials shall be in accordance with but not limited to applicable provisions of 40 CFR Parts 761 Subpart K, 761, and 761.65 and the Connecticut General Hazardous Waste Statute Sec. 22a-454.

F. Project Procedures for Work Involving Hazardous Materials, Wastes, and Items and Universal Wastes (Including Products Containing Persistent Bioaccumulative Toxic Chemicals) (PBTs) such as Polychlorinated Biphenols (PCBs), Di-2-ethylhexyl Phthalate (DEHP), and Mercury):

2. The **Owner** is responsible for abating all **Hazardous Materials, Wastes, and Items and Universal Wastes** including products containing Persistent Bioaccumulative Toxic Chemicals" (PBTs) such as Polychlorinated Biphenols (PCBs), Di-2-ethylhexyl Phthalate (DEHP), and Mercury prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
2. If a **Hazardous Materials, Wastes, and Items and Universal Wastes Inventory** has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair, then the results of the inventory are summarized in **Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory** at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of Hazardous Materials, Wastes, and Items and Universal Wastes. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work
3. If the Contractor should encounter any Hazardous Materials, Wastes, and Items and Universal Wastes **that were not previously identified and assigned as the Contractor's responsibility**, then the Contractor should immediately notify the Construction Administrator **in writing** of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within **four (4) Calendar Days** after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. **The Owner will abate Hazardous Materials, Wastes, and Items and Universal Wastes (if necessary) within a reasonable time period, i.e. within ten (10) calendar days.**
4. Exposure Levels for PBTs such as PCBs, DEHP, and mercury in the construction industry are regulated by 29 CFR 1910.1200 and 29 CFR 1926.28 et. al. Demolition and removal work may expose workers in excess of the respective Permissible Exposure Limit (PEL). Conduct demolition and removal work specified in the technical sections of these specifications in conformance with these regulations.
5. Examples of Hazardous Materials, Wastes, and Items and Universal Wastes include, but are not limited to, fluorescent light fixtures and exit signs, ballasts, high-intensity discharge (HID) lamps, certain types of construction products containing vinyl, mercury containing electrical switches, gauges, and thermostats; PCB Capacitors, refrigerants, pressurized cylinders, smoke/carbon dioxide detectors, used electronics, batteries, transformer/hydraulic fluids/oils, and miscellaneous household hazardous waste.
6. For the purposes of this paragraph, **PCB's in building material such as caulk and glazing or any other type of material not listed above is not applicable to this paragraph.**
7. Construction debris/waste may be classified as hazardous waste. Disposal of all hazardous materials shall be in accordance with but not limited to applicable provisions of 40 CFR Parts 761 Subpart K, 761, and 761.65 and the Connecticut General Hazardous Waste Statute Sec. 22a-454.

G. Project Procedures for Work Involving Regulated Soils:

1. The **Owner** is responsible for the excavation, staging, loading, transportation, and disposal of all Regulated Soils prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
2. The **Owner** shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations and as specified in **Section 01 35 16 Alteration Project Procedures** and **Section 01 20 00 Contract Considerations, Section 01 35 29 Environmental Health and Safety, Section 01 50 00 Temporary Facilities and Controls, Section 02 41 13 Selective Demolition, Section 02 41 16 Structure Demolition, Section 02 50 00 Demolition**

and Alterations, Section 02 61 13 Handling of Regulated Soil, Section 02 80 00 Contaminated Materials Excavation, Staging, Loading, Transportation, and Disposal, Section 02 81 00 Transportation and Disposal of Regulated Soil, Section 31 10 00 Site Clearing, Section 31 20 00 Site Earth Moving, Section 31 20 01 Building Excavation and Backfill, Section 50 00 00 Project-Specific Additional Information, and Drawing EV-1.00 Limits of Regulated Soil.

3. If the Owner has tested the facility scheduled for renovation, demolition, reconstruction alteration, remodeling or repair for Regulated Soils, then the results are located in **Division 50 00 00 Project-Specific Available Information, Section 50 20 00 Environmental Assessment Information** at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of Regulated Soil. It is the Contractor's responsibility to verify all materials and field conditions prior to renovation, demolition, reconstruction, alteration, remodeling, or repair that may affect the performance of their Work.
4. If the Contractor should encounter any **Regulated Soil that was not previously identified and assigned as the Contractor's responsibility**, he should immediately notify the Construction Administrator **in writing** of same. It is the State's responsibility to have the soil tested and remediated (if necessary). The Owner will respond within **four (4) Calendar Days** after receiving the Contractor's written request to the Construction Administrator for testing the suspect soil. **The Owner will remediate and dispose of the regulated soil (if necessary) within a reasonable time period, i.e. within ten (10) calendar days.**
 - 4.1 When the **Owner** requests the **Contractor** undertake the responsibilities **for the remediation and disposal of all Regulated Soils**, then the compensation to the Contractor by Owner for the Work shall be determined by the **"Unit Prices"** stated in **Section 01 20 00 Contract Considerations**.
5. Disposal of all hazardous materials shall be in accordance with but not limited to applicable provisions of 40 CFR Parts 761 Subpart K, 761, and 761.65 and the Connecticut General Hazardous Waste Statute Sec. 22a-454.

H. Project Procedures for Work Involving Contaminated Groundwater:

1. The **Owner** is responsible for the permitting and disposal of Contaminated Groundwater prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
2. The **Owner** shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations and as specified in **Section 01 35 16 Alteration Project Procedures** and **Section 01 35 29 Environmental Health and Safety, Section 01 50 00 Temporary Facilities and Controls, Section 02 41 13 Selective Demolition, Section 02 41 16 Structure Demolition, Section 02 50 00 Demolition and Alterations, Section 31 23 19 Wastewater Treatment Systems, and Section 50 00 00 Project-Specific Additional Information**.
3. If the Owner has tested the facility scheduled for renovation, demolition, reconstruction alteration, remodeling or repair for Contaminated Groundwater, then the results are located in **Division 50 00 00 Project-Specific Available Information, Section 50 20 00 Environmental Assessment Information** at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of Contaminated Groundwater. It is the Contractor's responsibility to verify all materials and field conditions prior to renovation, demolition, reconstruction, alteration, remodeling, or repair that may affect the performance of their Work.
4. If the Contractor should encounter any Contaminated Groundwater **that was not previously identified, characterized, permitted, and assigned as the Contractor's responsibility**, he should immediately notify the Construction Administrator **in writing** of same. It is the State's responsibility to have the groundwater tested and abated (if necessary). The Owner will respond within **four (4) Calendar Days** after receiving the Contractor's written request to the Construction Administrator for testing the suspect groundwater. **The Owner shall arrange for the permitting and disposal of the Contaminated Groundwater if necessary) within a reasonable time period, i.e. within ten (10) calendar days.**

- I. See also **General Conditions Article 23 "Cutting, Fitting, Patching and Digging"**.

3.2 PREPARATION

- A. Cut, move, or remove items as are necessary for access to alteration and renovation Work. Replace and restore at completion.

- B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
- E. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

3.3 INSTALLATION

- A. Coordinate alteration and renovation Work to expedite completion, and if required sequence Work to accommodate Owner occupancy.
- B. Remove, cut and patch Work in a manner to minimize damage and to provide restoring products and finishes to original and or specified condition in accordance with **Section 01 73 29 "Cutting and Patching"**.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes in accordance with **Section 01 73 29 "Cutting and Patching"**.
- D. In addition to specified replacement of **equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning, and electrical systems** to full operational condition.
- E. Recover and refinish Work that exposes mechanical and electrical Work exposed accidentally during the Work.
- F. Install products as specified in individual specification sections.

3.4 TRANSITIONS

- A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch work to match existing adjacent Work in texture and appearance.
- B. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect/Engineer.

3.5 ADJUSTMENTS

- A. Where removal of partitions or walls result in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- B. Where a change of plane of 1/4-inch in (12) inches or more occurs, request recommendation from Architect/Engineer for providing a smooth transition.
- C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- D. Fit Work at penetrations of surfaces as specified in **Section 01 73 29 "Cutting and Patching"**.

3.6 REPAIR OF DAMAGED SURFACES

- A. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing imperfections.
- B. Repair substrate prior to patching finishes.

3.7 FINISHES

- A. Finish surfaces as specified in individual product specification sections.
- B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.8 CLEANING

- A. In addition to cleaning specified in **Section 01 50 00 "Temporary Facilities and Controls"**, clean Agency occupied areas of Work.

END OF SECTION 01 35 16

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.

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
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 **cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties.** Meet the following requirements within the SSHO:

[Level 3: 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.

D. Associate Safety professional (ASP), Certified Safety Trained Supervisor (STS) and/or Construction Health and Safety Technician (CHST):

Provide a **Certified Safety Trained Supervisor (STS)** at the work site to perform safety management, surveillance, inspections, and safety enforcement for the Contractor. The **STS** shall be the safety and occupational health "competent person" as defined by this section. The **STS** 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 **STS** 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 **production and 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. Certified Safety Trained Supervisor (STS):

- 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**, 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.

If the **STS** is appointed as 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 Core 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.

3.1.3 UNFORESEEN HAZARDOUS MATERIAL

- A. Related Section: Division 01, Section 01 35 16, Alteration Project Procedures.

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 (610 mm)** 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 (30.5 m)** if parallel within **Five (5) feet (1.5 m)** 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.
 - 1.1 CT Supplement - [N/A].
 - 1.2 CT Amendments – [N/A].
 - 1.3 International Building Code - 2015.
 - 1.4 International Existing 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](#).
 - 2.1 CT Supplement - [\[N/A\]](#).
 - 2.2 CT Amendments - [\[N/A\]](#).
 - 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 - [1978](#).
 - 4.2 OSHA 29 CFR Part 1926 Occupational Safety and Health Regulations for Construction - 1979.
- 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

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 NFPA 72.
- 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 per NFPA 72.
 - 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, shall be given to the Department of Construction Services representatives. This shall be in Accordance with NFPA 72. 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.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 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

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. 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 lifts, hoists and elevator use.**
 - 4. **Temporary project identification signs.**
 - 5. **Collection and disposal of waste and cleaning.**
 - 6. **Temporary Environmental Controls.**
 - 7. **Stairs.**
- C. 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. **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:** The Agency will allow the toilets located in the building for Contractor use. If others are needed, 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 "General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities" (DEEP-WPED-GP-015) "draft" registration and the Stormwater

Pollution Control Plan (SPCP) are attached to the technical **Section 312005 Sedimentation and Erosion Control**.

2. The Contractor shall assume responsibility for storm water pollution control by completing and electronically registering through the Connecticut Department of Energy and Environmental Protection's (DEEP) **ezFile Portal** the "General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities" and the SPCP; and conform to the general permit requirements. The Contractor shall serve as the *Signatory Authority, Developer, Permittee, Registrant, and Applicant*, as the case may be.
3. The Contractor shall set up an **ezFile account** and create a **Subscriber Agreement (SA)** prior to Contract Award and prior to registering the general permit.
4. The Contractor shall **electronically register** the general permit and SPCP with DEEP prior to Contract Award and **at least sixty (60) days** prior to the commencement of activity involving total soil disturbance area of **one (1) to twenty (20) acres** or **ninety (90) days** prior to the commencement of activity involving a total soil disturbance area **greater than twenty (20) acres**.
5. The Owner shall be responsible for the registration fee.
6. The Contractor shall conform to the SPCP included in the Contract Documents or use another plan, prepared at the Contractor's expense, which has been approved by the Owner and the DEEP.
7. At the completion of the construction project, the Contractor shall submit to the DEEP a "Notice of Termination" (DEEP-PED-NOT-015) per the general permit. Concurrent with this Notice of Termination, the Contractor shall submit a "License Transfer Form" (DEEP-APP-006) to DEEP transferring the registration to the Agency.
 - 7.1 The Contractor shall be responsible for preparing and obtaining the necessary information and signatures for the License Transfer Form. The proposed transferee (new registrant) shall be the Agency. The new billing contact shall be the Owner. The Owner shall be responsible for the transfer fee.
8. Prior to submitting the Notice of Termination, the Contractor shall submit to the Agency copies of the SPCP, all reports required by the general permit, all inspection records, and records of all data used to complete the registration for the general permit.
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.

3.3 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. **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.
- C. **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.
- D. 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.
- E. 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 (<https://portal.ct.gov/DAS/Lists/DAS-Construction-Services-Library>) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 3000 Series - Design Phase Forms.
- F. Temporary Exterior Lighting:** Install exterior yard and sign lights so signs are visible when Work is being performed.
- G. 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.

H. 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.

- I. **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. Identification Badges for Contractor's Personnel, Visitors & Parking Stickers:**
1. The Contractor will provide each person working or visiting at the site with an identification badge, bearing the name of the Contractor and a number. As badges are assigned, a record shall be kept by the Contractor and given to the Construction Administrator and Agency Administrator. Update and correct the records of all badges issued on a semi-monthly basis.

2. Badges are to be worn on outer garment where visible at all times while at the construction site, return them to the Contractor's field office at the end of each day and pick them up there each morning.
3. All vehicles parking in the Contractor's parking lot and those used around the site require an ID sticker. They will be issued by the Agency. Each contractor shall apply for parking stickers through the Construction Administrator no more than semi-monthly and shall keep record of all stickers issued.

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.

END OF SECTION 01 50 00

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:
 - 1. Description of a Construction Indoor Air Quality (IAQ) Management Plan.
 - 2. IAQ construction requirements.
- 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 01 Section 01 45 23.13 "Testing for IAQ, Baseline IAQ, & Materials."
 - 3. Division 01 Section 01 57 30 "Indoor Environmental Control."
 - 4. Division 01 Section 23 05 93 "Testing, Adjusting and Balancing for HVAC" for additional requirements for baseline testing for IAQ.
 - 5. Division 01 Section 23 05 93 "Testing, Adjusting and Balancing for HVAC" for cleaning of HVAC system including ductwork, air intakes and returns, and changing of filters.

1.3 REFERENCES

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):
 - 1. ASHRAE Standard 52.1-1992, Gravimetric and Dust Spot Procedures for Testing Air Cleaning Devices in General Ventilation for Removing Particulate Matter.
- 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 National Contractors' National Association (SMACNA):
 - 1. IAQ Guidelines for Occupied Buildings under Construction, 1995.

1.4 INDOOR AIR QUALITY

- A. Goals: The Owner has set the following indoor air quality goals for jobsite operations on the project, within the limits of the construction schedule, Contract Sum, and available materials, equipment, products and services. Goals include:
 - 1. Protect workers on the site from undue health risks during construction.
 - 2. Prevent residual problems with indoor air quality in the completed building.

1.5 SUBMITTALS

- A. Indoor Air Quality Plan: Within **fourteen (14)** days after receipt of **Notice of Award** and prior to any waste removal from the project, develop and submit for review a healthy indoor air quality plan. The plan shall include:
 - 1. List of IAQ protective measures to be instituted on the site.
 - 2. Schedule for inspection and maintenance of IAQ measures.

1.6 QUALITY ASSURANCE

- A. Perform material tests and report results in accordance with ASTM D5116.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Should the Contractor desire to use procedures, materials, equipment, or products that are not specified but meet the intent of the specifications to protect indoor air quality on the site, the Contractor shall propose these substitutions in accordance with Section 01 60 00 "Product Requirements."

2.2 MATERIALS

- A. Low emitting products have been specified in appropriate sections.

PART 3 - EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT PLAN

- A. Meet or exceed the minimum requirements of the SMACNA "IAQ Guidelines for Occupied Buildings Under Construction."
 - 1. Protect the ventilation system components from contamination, OR provide cleaning of the ventilation components exposed to contamination during construction prior to occupancy.
 - 2. 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.
 - 3. 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.
- B. During installation of carpet, paints, furnishings, and other VOC-emitting products, provide supplemental (spot) ventilation for at least 72 hours after work is completed. Preferred HVAC system operation uses supply air fans and ducts only; exhaust provided through windows. Use exhaust fans to pull exhaust air from deep interior locations. Stair towers and other paths to exterior can be useful during this process.
- C. Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection, and ventilation rate.
- D. Require VOC-safe masks for workers installing VOC-emitting products (interior and exterior) defined as products that emit 150 gpl or more UNLESS local jurisdiction's requirements are stricter, in which case the strictest requirements shall be followed for use of VOC-safe masks.
- E. Use low-toxic cleaning supplies for surfaces, equipment, and worker's personal use. Options include several soybean-based solvents and cleaning options (SoySolv) and citrus-based cleaners.
- F. Use wet sanding for gypsum board assemblies. Exception: Dry sanding allowed subject to Architect's approval of the following measures:
 - 1. Full isolation of space undergoing finishing.
 - 2. Plastic protection sheeting is installed to provide air sealing during sanding.
 - 3. Closure of all air system devices and ductwork.
 - 4. Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust.
 - 5. Worker protection is provided.
- G. Use safety meetings, signage, and Contractor agreements to communicate the goals of the construction indoor air quality plan.

END OF SECTION 01 57 40

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

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.
- 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

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 cutting and patching.
- 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 cutting and patching with other construction activities.
 2. Division 01 Section 01 35 16 "Alteration Project Procedures" for procedures for coordinating cutting and patching with other construction activities.
 3. Division 02 Section **02 41 19 "Selective Structure Demolition"** for demolition of selected portions of the building for alterations.
 4. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 22, 23, and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 SUBMITTALS

- A. **Cutting and Patching Proposal:** Submit a proposal to the Construction Administrator describing procedures well in advance of the time cutting and patching will be performed and if the Owner's Representative and/or Architect/Engineer requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 3. Describe affects to integrity of weather exposed or moisture resistant element.
 4. Describe affects to efficiency, maintenance, or safety of any operational element.
 5. Describe affects to Work of Owner or separate contractor.
 6. List products to be used and firms or entities that will perform Work.
 7. Indicate dates when cutting and patching will be performed.
 8. **Utilities:** List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 9. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations sealed by an Engineer registered in the State of Connecticut showing integration of reinforcement with the original structure.
 10. Approval by the Construction Administrator to proceed with cutting and patching does not waive the Architect/Engineer of Record's rights to later require complete removal and replacement of unsatisfactory Work.

1.4 QUALITY ASSURANCE

- A. **Requirements for Structural Work:** Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
1. Obtain approval from the Architect/Engineer of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. **Foundation construction.**

- b. **Bearing and retaining walls.**
 - c. **Structural concrete.**
 - d. **Structural steel.**
 - e. **Lintels.**
 - f. **Structural decking.**
 - g. **Miscellaneous structural metals.**
 - h. **Exterior curtain-wall construction.**
 - i. **Equipment supports.**
 - j. **Piping, ductwork, vessels, and equipment.**
 - k. **Structural systems of special construction in Division 13 Sections.**
- B. Operational Limitations:** Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
- 1. Obtain Architect/Engineer's approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. **Primary operational systems and equipment.**
 - b. **Air or smoke barriers.**
 - c. **Water, moisture, or vapor barriers.**
 - d. **Membranes and flashings.**
 - e. **Fire protection systems.**
 - f. **Noise and vibration control elements and systems.**
 - g. **Control systems.**
 - h. **Communication systems.**
 - i. **Conveying systems.**
 - j. **Electrical wiring systems.**
 - k. **Operating systems of special construction in Division 13 Sections.**
- C. Visual Requirements:** Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1.5 WARRANTY

- A. Existing Warranties:** Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A.** Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.
- B.** The Contractor shall install sleeves, inserts and hangers furnished by the trades needing same.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, notify the Construction Administrator and Architect, before proceeding with corrective action.
- B. Openings and chases may not be shown on the Drawings. It is the responsibility of the Contractor to examine the Architectural, Electrical, Heating, Cooling, Ventilating and Plumbing Drawings and to provide chases, channels or openings where needed.
 - 1. After installing Work into openings, channels and/or chases, the Contractor shall close same. If finishes are to be restored, the new Work shall match the original and shall be done by the trade customarily responsible for the particular kind of Work.
- C. The Contractor shall verify dimensions for built-in Work and/or Work adjoining that of other trades before ordering any material or doing any Work. Discrepancies shall be submitted to the Construction Administrator before proceeding with the Work.
- D. See also General Conditions Article 23 "Cutting, Fitting, Patching & Digging".

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Work that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. **General:** Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
 - 2. DO perform cutting and patching to integrate elements of Work. Provide penetrations of existing surfaces. Provide samples for testing. Seal penetrations through floors, walls, ceilings and roofs, as applicable; restore or preserve fire-rated and smoke-barrier construction. Construction and finishes shall match original Work.
- B. **Cutting:** Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
 - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 - 4. Comply with requirements of applicable Division 32 Sections where cutting and patching requires excavating and backfilling.
 - 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. **Patching:** Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 4. Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- 3.4 CLEANING**
- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

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 requirements for waste management goals, waste management plan and waste management plan implementation.
- 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 20 00 "Price and Payment Procedures".
 - 3. Division 01 Section 01 25 00 "Substitution Procedures".
 - 4. Division 01 Section 01 31 19 "Project Meetings".
 - 5. Division 01 Section 01 33 00 "Submittal Procedures".
 - 6. Division 01 Section 01 45 00 "Quality Control".
 - 7. Division 01 Section 01 50 00 "Temporary Facilities and Controls".
 - 8. Division 01 Section 01 60 00 "Product Requirements".
 - 9. Division 01 Section 01 77 00 "Closeout Procedures".
 - 10. Division 01 Section 01 81 13 "Sustainable Design Requirements".

1.3 DEFINITIONS

- A. **Construction Waste:** Solid wastes such as building materials, packaging and rubble resulting from construction, paving and infrastructure.
- B. **Demolition Waste:** Solid wastes such as concrete, wood, brick, plaster, roofing materials, wallboard, metals, carpeting, insulation, and clean fill resulting from demolition or selective demolition of structures.
- C. **Recyclable Materials:** Products and materials that can be recovered and remanufactured into a new product. Recyclable materials include, but are not limited to, the following:
 - 1. Metals (ferrous and non-ferrous), including banding, metal studs, ductwork, and piping.
 - 2. Asphaltic concrete paving.
 - 3. Portland cement concrete.
 - 4. Gypsum products.
 - 5. Paper and cardboard.
 - 6. Wood products, including structural, finish, crates, and pallets.
 - 7. Brick and masonry.
 - 8. Carpet and padding.
 - 9. Plastics.
 - 10. Copper wiring.
- D. **Recycling Facility:** A business that specializes in collecting, handling, processing, distributing, or remanufacturing waste materials generated by new construction projects, into products or materials that can be used for this project or by others.
- E. **Salvage and Reuse:** Existing usable product or material that can be saved and reused in some manner on the project site. Materials for reuse must be approved by the Architect. Materials that can be salvaged and reused must comply with applicable technical specifications and include, but are not limited to, the following:
 - 1. Dimensional lumber and other wood products.
 - 2. Structural steel.
 - 3. Soil.
 - 4. Masonry products.

5. Plants.

F. **Salvage for Resale:** Existing usable product that can be saved and removed intact (as is) from the project site to another site for resale to others without remanufacturing.

1.4 WASTE MANAGEMENT GOALS

- A. The Owner has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. The Contractor shall use all means available to divert the greatest extent practical and economically feasible, construction waste from landfills and incinerators.
- C. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.
- D. Recycle and/or salvage a minimum of **50** percent of non-hazardous construction **and demolition** waste by weight of the total solid waste generated by the Project.
- E. With regard to these goals the Contractor shall develop, for the Architect's review, a Waste Management Plan for this Project.
- F. Take a pro-active, responsible role in management of construction waste and require all subcontractors, vendors, and suppliers to participate in the effort. Establish a construction waste management program that includes the following categories:
 - 1. Minimizing packaging waste.
 - 2. Salvage and reuse.
 - 3. Salvage for resale or donation.
 - 4. Recycling.
 - 5. Disposal.

1.5 SUBMITTALS

- A. **Draft Waste Management Plan:** Within 30 days after receipt of Notice of Award of Bid, or prior to any waste removal, whichever occurs sooner, the Contractor shall submit **three (3)** copies of a Draft Waste Management Plan to the Construction Administrator.
- B. **Final Waste Management Plan:** Once the Owner has determined which of the recycling options addressed in the Draft Waste Management Plan are acceptable, the Contractor shall submit within 10 days **three (3)** copies of a Final Waste Management Plan.
- C. **Progress Reports:** Submit **three (3)** copies of monthly progress reports, at the same time as the Application for Payment, documenting the following:
 - 1. Material category.
 - 2. Point of waste generation.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, in tons.
 - 5. Quantity of waste recycled, in tons.
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- D. **Calculations:** Submit **three (3)** copies of calculations indicating the end-of-project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Project prior to Substantial Completion.
- E. **Record Submittals:**
 - 1. **Donations:** Indicate which salvageable materials were donated, who they were donated to, and whether the recipient is tax exempt. Submit documentation indicating receipt of donations.
 - 2. **Sales:** Indicate which salvageable materials were sold, who they were sold to, and whether the recipient is tax exempt. Submit documentation indicating receipt of materials.
 - 3. **Recycling:** Indicate which materials were recycled and the name of the facility licensed to accept them. Submit documentation such as manifests, weight tickets, receipts, and invoices.

4. **Waste Disposal:** Indicate which materials were accepted as waste by landfills and incinerator facilities licensed to accept them. Submit documentation indicating receipt of materials.

1.6 QUALITY ASSURANCE

- A. **Regulatory Requirements:** Comply with regulations of State of Connecticut Department of Environment Protection, Waste Management Bureau Recycling Program.
- B. **Waste Management Conference:** Review and discuss the waste management plan, requirements for documenting quantities of each type of waste and its disposition, procedures for materials separation, procedures for periodic collection and transportation to recycling and disposal facilities. Review waste management requirements for each trade. Verify availability of containers and bins needed to avoid delays.

1.7 WASTE MANAGEMENT PLAN

- A. **Draft Waste Management Plan:** Include the following in the Draft Plan:
 1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
 2. **Landfill Options:** The name of the landfill(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Project waste in the landfill(s).
 3. **Alternatives to Landfilling:** A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed local market for each material, and the estimated net cost savings or additional costs resulting from separating and recycling (versus landfilling) each material. "Net" means that the following have been subtracted from the cost of separating and recycling:
 - a. Revenue from the sale of recycled or salvaged materials and
 - b. Landfill tipping fees saved due to diversion of materials from the landfill. The list of these materials is to include, at a minimum, the following materials:
 - i) Cardboard.
 - ii) Clean dimensional wood.
 - iii) Beverage containers.
 - iv) Land clearing debris.
 - v) Concrete.
 - vi) Bricks.
 - vii) Concrete Masonry Units (CMU).
 - viii) Asphalt.
 - ix) Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
- B. **Resources for Development of Waste Management Plan:** The following sources may be useful in developing the Draft Waste Management Plan:
 1. **Recycling Haulers and Markets:** Local haulers and markets for recyclable materials. For more information, contact the State of Connecticut Department of Environmental Protection, Waste Management Bureau Recycling Program, (860) 424-3365, www.dep.state.ct.us/wst/recycle/ctrecycle.htm.
- C. **Final Waste Management Plan:** The Final Waste Management Plan shall contain the following:
 1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
 2. **Landfill Options:** The name of the landfill(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Project waste in the landfill(s).
 3. **Alternatives to Landfilling:** A list of the waste materials from the Project that will be separated for reuse, salvage, or recycling.
 4. **Meetings:** A description of the regular meetings to be held to address waste management. Refer to Section 01 31 19 "Project Meetings".
 5. **Materials Handling Procedures:** A description of the means by which any waste materials identified in item (3) above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.

- 6. Transportation:** A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

1.8 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager:** The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- B. Distribution:** The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Architect.
- C. Instruction:** The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.
- D. Separation Facilities:** The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
- E. Hazardous Wastes:** Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
- F. Application for Progress Payments:** The Contractor shall submit with each Application for Progress Payment a Summary of Waste Generated by the Project. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment. The Summary shall be submitted on a form acceptable to the Owner and shall contain the following information:
1. The amount (in tons or cubic yards) of material landfilled from the Project, the identity of the landfill, the total amount of tipping fees paid at the landfill, and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.
 2. For each material recycled, reused, or salvaged from the Project: the amount (in tons or cubic yards), the date removed from the jobsite, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling of each material shall be indicated. Attach manifests, weight tickets, receipts, and invoices.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 – EXECUTION

3.1 PLAN IMPLEMENTATION

- A.** Implement the waste management plan as approved by **Owner**.
- B.** Provide training of workers, contractors, subcontractors, and suppliers on proper waste management procedures.
1. Distribute waste management plan to all parties involved in the Project within **three (3)** days of submittal return.
 2. Distribute plan to parties when they first begin working on the Project site. Review plan procedures and locations established for salvage, recycling, and disposal.

3.2 SEPARATION OF RECYCLABLE WASTE MATERIALS

- A.** Provide the necessary containers and bins, to facilitate the waste management program, that are clearly and appropriately marked. Prevent contamination of recyclable materials from incompatible products and materials. Separate construction waste at the project site by one of the following methods:
1. **Source Separated Method:** Waste products and materials, that are recyclable, are separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Trash is transported to a landfill or incinerator.

2. **Co-Mingled Method:** All construction waste is placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed and the remaining trash is transported to a landfill or incinerator.
3. Other methods proposed by the Contractor and approved by the **Owner**.

END OF SECTION 01 74 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 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

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

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:

Specification / Warranty Table			
Item No.	Section No.	N/A	Specification Product/Warranty
1.	03	N/A	Floor hardener: 5 year, material and workmanship.
2.	05	N/A	Expansion Joint Covers: 5 year material & workmanship.
3.	07	N/A	Single-Ply Membrane Roofing, Base Flashing and Insulation: 25 year unlimited, materials and installation [the manufacturer's no dollar limit (NDL) warranty], and; 2 year General Contractor's warranty for installation.
4.	07	N/A	Built Up Roofing (BUR) and Modified Asphalt Roofing, Base Flashing, and Insulation: 20 year unlimited materials and Installation [the manufacturer's no dollar limit (NDL) warranty], and; 2 Contractor's warranty for installation.
5.	07	N/A	Metal Roofing and Siding: 20 year against rupture, cracks or perforation due to corrosion, and; 20 year for fluorocarbon finish (if used) against peeling, blistering, fading and chalking as limited by industry standards, and; 10 year weathertightness warranty by General Contractor's installer.
6.	07	N/A	Copper Roofing: 10 year against rupture, cracks or perforation due to corrosion and including materials and workmanship.
7.	07	N/A	Vents and Hatches: 5 year product and installation, including weathertightness.
8.	07	N/A	Waterproofing: 5 year material and workmanship.
9.	07	N/A	Water Repellent: The term offered for the Specific product.
10.	07	N/A	Exterior Expansion Joint Covers: 5 year material and workmanship, including weathertightness.
11.	07	N/A	Wood Shingles (roofing, siding): 10 year for material and workmanship.
12.	07	N/A	Exterior - Interior Caulking and Sealants: 5 year, material and workmanship.
13.	07	N/A	Metal Flashing and Sheet Metal: 3 year, material and workmanship.
14.	07	N/A	Asphalt Roof Shingles: 25 year, material pro-rated.
15.	07	N/A	Asphalt Roof Shingles Installation: 15 year, workmanship, pro-rated.
16.	08	N/A	Solid Wood Core and Mineral Core doors: Lifetime for interior doors. 5 year for exterior doors.
17.	08	N/A	Overhead Doors (coiling or sectional): 5 year material and workmanship.
18.	08	N/A	Skylights: 5 Year product and installation, including weathertightness.
19.	08	N/A	Closers, Locksets, Exit Bolts: Longest term offered by manufacturer for grade/class of particular item, material and workmanship.

Specification / Warranty Table (Continued)			
Item No.	Section No.	Specification	Product/Warranty
20.	08	N/A	Insulating glass: 10 year against failure of hermetic seal, interpane dusting, or misting including replacement of unit.
21.	08	N/A	Windows: 5 year material and workmanship including weathertightness.
22.	08	N/A	Laminated Glass: 10 year against delamination.
23.	08	N/A	Storefront/Curtain Wall: 5 year material and workmanship (insulating glass separate). Air and water infiltration and strength to specified AAMA designation.
24.	09	N/A	Carpet: 10 year wear and color fastness, and; 3 year installation.
25.	10	N/A	Operable Partitions: 5 Years, material, and workmanship.
26.	10	N/A	Mirrors: 15 years against silver spoilage.
27.	14	N/A	Elevators and Wheelchair Lifts: 18 months for material, workmanship, and installation.
28	22	N/A	Electric Heating Cable: 10 years, material, and installation.
29	22	N/A	Water Softener: 10 years, material, and installation.
30	22	N/A	Instantaneous Heat Exchangers: 1 year, material, and installation.
31	23	N/A	Fuel Storage Tank: 30 years, material, and installation.
32	23	21 23	Compressors and Pumps: 5 years, material and installation,
33	26	09 23	Dimming Controls: 8 years, material and installation,
34	26	05 19	Switchboards and Panels: 5 years, material and installation,
35	26	N/A	Engine Generators: 10 years, material and installation,
36	26	N/A	Uninterruptable Power Supply: 3 years, material and installation,
37	26	09 23	Emergency Lighting Batteries: 10 years, material and installation,
38	26	N/A	Lighting Ballasts: 5 years, material and installation,
39	32	N/A	Plant Material, Turf and Grasses: 24 months, material and installation, and growth.

H. Submit certification that finish materials are fire rated as specified.

J. Form of Warranty: Warranties shall be submitted in following format:

Warranty			
Commissioner: <i>Josh Geballe</i> Department of Administrative Services DAS Commissioner's Office 450 Columbus Boulevard, Suite 1501 Hartford, CT 06103			
Project Number: <i>BI-MH-111</i> Project Title: <i>Energy Upgrades - Greater Bridgeport Community Mental Health Center</i>			
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 <input type="checkbox"/>	Subcontractor <input type="checkbox"/>	Vendor/Suppliers <input type="checkbox"/>	Manufacturer <input type="checkbox"/>
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: _____			

- K. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Administrative Services on companies' standard form.
- L. 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.
- M. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Administrative Services, on company's standard form.
- N. 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

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 equipment and system commissioning, including the following:
1. Completion of commissioning procedures on specific equipment and systems as indicated under "Related Sections" below.
 2. Verification of operational and functional performance of specific equipment and systems for compliance with the "Design Intent" as described in the "Related Sections" indicated below.
- B. **Related Sections:** The following Sections contain requirements that relate to this Section:
1. Section 01 31 00 "Project Management And Coordination" specifies procedures for coordinating the Commissioning Process.
 2. Division 01 Section 01 33 00 "Submittal Procedures" specifies procedures for submittal of Product Data and Quality Assurance Submittals.
 3. Division 01 Section 01 77 00 "Closeout Procedures" specifies general closeout requirements.
 4. Division 21 Section 21 08 00 "Commissioning of Fire Suppression" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
 5. Division 22 Section 22 08 00 "Commissioning of Plumbing" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
 6. Division 23 Section 23 08 00 "Commissioning of HVAC" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
 7. Division 23 Section 23 08 00 "Commissioning of HVAC" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
 8. Division 25 Section 25 08 00 "Commissioning of Integrated Automation" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
 9. Division 26 Section 26 08 00 "Commissioning of Electrical Systems" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
 10. Division 27 Section 27 08 00 "Commissioning of Communications" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.

1.3 DEFINITIONS

- A. **Basis of Design (BOD):** A document that records the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements 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.
- B. **Commissioning Agent (CxA):** An entity identified by the Owner who leads, plans, schedules, and coordinates the commissioning team to implement the Commissioning Process.
- C. **Commissioning (Cx) Plan:** A plan that includes a list of all equipment to be commissioned, delineation of roles for each of the primary commissioning participants, and details on the scope, timeline, and deliverables throughout the commissioning process."
- C. **Deficiencies and Resolutions List:** List of noted deficiencies discovered as result of commissioning process.
- E. **Final Commissioning Report:** Overall final commissioning document (see 1.6, I(2) below), prepared by the Commissioning Agent, which details the actual commissioning procedures performed, inspection and testing results, and the final version of the deficiencies and resolutions list indicating that all issues discovered through the commissioning process have been verified as resolved.
- F. **Functional Completion:** Functional Completion is when all remaining TAB (Testing, Adjusting, Balancing) and commissioning responsibilities of the Contractor and their subcontractor's (except for seasonal or

- approved deferred testing and controls training), have been functionally certified as complete by the Owner's Commissioning Agent (CxA) and the Certificate of Functional Completion has been issued.
- G. Functional Performance Testing Process:** Documented testing of system parameters, under actual or simulated operating conditions. Functional testing is the dynamic testing of systems (rather than just components).
 - H. Pre-Commissioning Checklists:** Installation and start-up items to be completed by the appropriate party prior to operational verification through Functional Testing.
 - I. Physical Inspection Process:** On-site inspection and review of related system components for conformance to the specifications.
 - J. Seasonal Commissioning Tests:** Functional Tests that are deferred until the system(s) will experience conditions closer to their intended design conditions.
 - K. Trending:** Monitoring using the building control system.

1.4 COORDINATION

- A. Commissioning Team:** The members of the commissioning team consist of the Commissioning Agent (CxA), the DAS/CS Project Manager (PM), the Construction Administrator (CA), the Contractor, the Architect and Design engineers (particularly the mechanical engineer), the Mechanical Subcontractor, the Electrical Subcontractor, the TAB representative, the Controls Subcontractor, any other installing subcontractors or suppliers of equipment. If known, the Agency's building or plant operator/engineer is also a member of the Commissioning team.
- B. Management:** The CxA is hired by the Owner. The CxA directs and coordinates the commissioning activities and the reports to the CA. All members of the Commissioning Team work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents. Refer to Section 01 91 00 Part 1.6 and 1.7 for additional management details.
- C. Scheduling.** The CxA will work with the CA and Contractor according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the CA and Contractor for scheduling commissioning activities. The Contractor will integrate all commissioning activities into their master CPM schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
 - 1. The CxA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The Commissioning Plan—Construction Phase provides a format for this schedule. As construction progresses more detailed schedules are developed by the CxA. The Commissioning Plan also provides a format for detailed schedules.

1.5 DESCRIPTION OF CONSTRUCTION PHASE COMMISSIONING PROCESS

- A.** As soon as practicable after the "Contract Start Date" the Commissioning Agent (CxA) will conduct a pre-installation commissioning "kick-off" meeting with the Subcontractors. Parties directly affected by the commissioning work will be required to attend. The CxA will explain the commissioning process in detail, and identify specific commissioning related responsibilities of the various parties.
- B.** Commissioning status meetings will be scheduled to occur during construction to monitor progress and to help facilitate the commissioning process. Contractor representatives will be required to attend these meetings.
- C.** Once Subcontractors have provided the CxA with written verification indicating completion of installation and startup procedures, the CxA will conduct an on-site physical inspection of the specific systems and equipment.
- D.** Upon confirmation of system readiness, the CxA will schedule with the Subcontractors to perform functional compliance with the project specifications and drawings. The CxA will oversee the process and will provide the format and documentation for these tests.
- E.** Deficiencies noted during these tests will be documented on the Deficiencies and Resolutions list. When corrected, issues will be resolved at the time of discovery. The responsible Contractor will resolve all other issues at a later date. All deficiencies will be noted by the CxA as either resolved or pending resolution.
- F.** The construction commissioning process will be complete when all noted deficiencies have been corrected, proved to be compliance with the project specifications or otherwise resolved to the satisfaction of the Owner and when the CxA has issued the Certificate of Functional Completion

1.6 COMMISSIONING AGENT'S (CxA's) DUTIES AND RESPONSIBILITIES

- A. Meet and communicate with the Owner's representatives, **Contractor, Construction Administrator, Subcontractors, equipment manufacturers' representatives, Architect, Engineer and others** as needed, to facilitate the commissioning process.
- B. Review commissioning related specifications, submittals and construction documents. Communicate noted deficiencies and concerns to the Owner, Architect and Engineer.
- C. Develop detailed and specific Functional Testing procedures for equipment and systems to be commissioned.
- D. Develop testing, adjusting and balancing (TAB) specifications. Oversee the TAB process.
- E. Perform site inspections and verify Construction Manager's subcontractor readiness for the Functional Testing process. Document deficiencies for future resolution.
- F. Witness contractor performed Functional Testing process as appropriate to verify contractor compliance with the functional testing procedures. Document deficiencies for future resolution.
- G. Provide the Owner, **Contractor, Construction Administrator, Architect, and Engineer** with a Final Commissioning Report to document the commissioning process and to verify that the commissioning process is complete.
- H. Verify that the Contractor O&M documentation is complete.
- I. **Commissioning Record in O&M Manuals.**
 - 1. The CxA is responsible to compile, organize and index the following commissioning data by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the Contractor, to be included with the O&M manuals. Three copies of the manuals will be provided. The format of the manuals shall be:
 - 1.1 **Tab I-1:** Commissioning Plan;
 - 1.2 **Tab I-2:** Final Commissioning Report (see (2) below)
 - 1.3 **Tab 01:** System Type 1 (chiller system, packaged unit, boiler system, etc.);
 - 1.3.1 **Sub-Tab A:** Design narrative and criteria, sequences, approvals for equipment in System Type 1;
 - 1.3.2 **Sub-Tab B:** Startup plan and report, approvals, corrections, blank Precommissioning Checklists;
 - .1 **Colored Separator Sheets**—for each equipment type (fans, pumps, chiller, etc.);
 - 1.3.3 **Sub-Tab C:** Functional tests (completed), trending and analysis, approvals and corrections, training plan, record and approvals, blank functional test forms and a recommended recommissioning schedule.
 - 1.4 **Tab 02:** System Type 2.....repeat as per above requirements for System 1.
 - 2. **Final Report Commissioning Report Details.** The final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:
 - 2.1 Equipment meeting the equipment specifications;
 - 2.2 Equipment installation,
 - 2.3 Functional performance and efficiency;
 - 2.4 Equipment documentation and design intent; and
 - 2.5 Operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.
- 2.6 **Pre-Occupancy Commissioning (Cx) Report:**

A Pre-occupancy Commissioning (Cx) Report shall be prepared by the Commissioning Agent (CxA) that demonstrates that the project has met all of the requirements spelled out in the following Table:

Twelve (12) Mandatory Requirements [16a-38k-3] Summary Table:		
	Regulation	Summary Description
1.	16a-38k-3(a)	Building Commissioning:
2.	16a-38 -3(b)	Integrated Design Process:
3.	16a-38k-3(d)	ENERGY STAR Products:
4.	16a-38k-3(c)	Energy Performance:
5.	16a-38k-3(e)	Indoor Air Quality Management Plan:
6.	16a-38k-3(f)	Water Usage:
7.	16a-38k-3(g)	Recycling of Materials:
8.	16a-38k-3(h)	Erosion and Sedimentation Control:
9.	16a-38k-3(i)	No Smoking Policy:
10.	16a-38k-3(j)	Integrated Pest Management Plan:
11.	16a-38k-3(k)	Chlorofluorocarbon (CFC)-Based Refrigerants:
12.	16a-38k-3(l)	Minimum Ventilation Requirement:

2.7 Post-Occupancy Commissioning (Cx) Report:

A Post-Occupancy Commissioning (Cx) Report shall be prepared by the Commissioning Agent (CxA) and submitted to the DAS/CS PM for review and approval. The approved Report shall be submitted by the State Agency that is responsible for the ongoing care, operation, and maintenance of the building to the CT OPM Secretary and the DAS Commissioner within one hundred eighty (180) days after one year of occupancy Date of DAS/CS Acceptance of the Work. The Report shall include results of any post-occupancy survey of building occupants, a description of any adjustments made to equipment or building operation and the reasons for which the changes were made, and one year of all energy usage by source and water usage.

3. Other documentation will be retained by the CxA.

1.7 DUTIES AND RESPONSIBILITIES OF OTHERS FOR COMMISSIONING

- A. The commissioning process will require the active participation of persons qualified to represent the Owner, Mechanical Engineer, Electrical Engineer, Construction Manager, Equipment Manufacturers' Representatives, Mechanical Subcontractor, HVAC Subcontractor, Controls Subcontractor, TAB Subcontractor, Electrical Subcontractor, and other specific subcontractors, as deemed appropriate. The CxA will witness the final functional performance commissioning process. Participants shall include in their contracts all costs necessary to participate in and complete the commissioning process.
- B. The Contractor will assure the participation and co-operation of the Subcontractors, as required to complete the commissioning process.
- C. The Owner will assure the participation of their chosen representatives as required to complete the commissioning process.
- D. The Architect will assure the participation of necessary representatives from the Design Team as required to complete the commissioning process. Design team members will provide prompt replies to requests for information issued during the commissioning process.
- E. It is the Contractor's specific responsibility to complete their respective start-up and checkout procedures, and to insure the complete readiness of equipment and systems, prior to the start of the functional performance testing phase. The CxA shall request written confirmation of system readiness for performance testing, from the appropriate Contractor or Subcontractor. Once the CxA is provided with confirmation of all related systems completion, the actual date and times for the functional performance testing process will be confirmed. Contractor and Subcontractors shall provide sufficient time, and qualified representatives, to complete this process at no additional cost to the State.
- F. After a second failure of a system to successfully meet the criteria as set forth in the functional performance testing process, the Contractor shall reimburse the Owner for all costs associated with any additional re-testing efforts made necessary due to remaining Contractor related system deficiencies previously reported by the Contractor as corrected. These costs shall also include the costs (where applicable) for the CxA.

- G. Training on related systems and equipment operation and maintenance shall only be scheduled to commence after final performance commissioning is satisfactorily completed, and systems are verified to be 100 percent complete and functional.

1.8 SUBMITTALS

- A. Refer to Section 01 33 00 Submittal Procedures.
- B. **Pre-Commissioning Checklist Forms:** Submit **two (2)** signed copies of the checklist forms to the CxA upon completion of all listed items.
- C. **Equipment Manufacturer's Startup Forms:** Submit **two (2)** completed copies of the installation and startup checklists provided by the equipment manufacturers to the CxA.
- D. **Test Reports:** Submit **two (2)** copies of test reports for equipment and systems to the CxA.
- E. **Control Schematics:** Submit **two (2)** copies of the control schematics for equipment, systems, and subsystems to the CxA.
- F. **Inspection Records:** Submit **two (2)** copies of the records of inspections for code compliance, and approved permits and licenses to operate the equipment and systems to the CxA.
- G. **Operating Data:** Submit **two (2)** copies of equipment and system operating data including all necessary instructions to facilitate operation to specified performance standards to the Owner.
- H. **Maintenance Data:** Submit **two (2)** copies of equipment and system maintenance data including all necessary information required to maintain the equipment and systems in continuous operation, such as the testing, balancing and adjusting report and the as-built drawings.

1.9 TRAINING OF OWNER PERSONNEL

- A. The Contractor shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.
- B. The CxA shall be responsible for overseeing and approving the content and adequacy of the training of Agency's personnel for commissioned equipment.
1. The CxA shall interview the Agency's facility manager and lead engineer to determine the special needs and areas where training will be most valuable. The Construction Administrator, Agency's facility manager, and CxA shall decide how rigorous the training should be for each piece of commissioned equipment. The CxA shall communicate the results to the Contractor of Subcontractors and vendors who have training responsibilities.
 2. In addition to these general requirements, the specific training requirements of Owner personnel by Subcontractor and vendors are specified in Divisions 21, 22, 23, 25, 26, and 27.
 3. The Contractor shall require each Subcontractor and vendor responsible for training to submit a written training plan to the CxA for review and approval prior to training. The plan will cover the following elements:
 - 3.1 Equipment (included in training);
 - 3.2 Intended audience;
 - 3.3 Location of training;
 - 3.4 Objectives;
 - 3.5 Subjects covered (description, duration of discussion, special methods, etc.);
 - 3.6 Duration of training on each subject;
 - 3.7 Instructor for each subject;
 - 3.8 Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.);
 - 3.9 Instructor and qualifications.
 4. For the primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.
 5. The CxA shall develop an overall training plan and coordinate and schedule, with the CA, Agency Representative, and Contractor, the overall training for the commissioned systems. The CxA shall develop criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The CxA shall recommend approval of the training to the CA using a standard form for submittal to the Contractor. The CA also shall sign the approval form.
 6. At one of the training sessions, the CxA shall present a **one (1)** hour presentation discussing the use of the blank functional test forms for re-commissioning equipment.

7. Video recording of the training sessions shall be provided by Contractor. The Contractor shall provide the CA, with video disks cataloged by Contractor, and added to the O&M manuals.
8. The HVAC design engineer shall at the first training session present the overall system design concept and the design concept of each equipment section. This presentation shall be **two (2)** hours in length and include a review of all systems using the simplified system schematics (one-line drawings) including chilled water systems, condenser water or heat rejection systems, heating systems, fuel oil and gas supply systems, supply air systems, exhaust system and outside air strategies.

1.10 DEFERRED TESTING

- A. **Unforeseen Deferred Tests.** If the Contractor determines that any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and Functional Testing may be delayed upon approval of the DAS/CS PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.
- B. **Seasonal Testing.** During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design intent) as specified in Division 23 shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate Subcontractors, with the Agency facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-built drawings due to the testing will be made.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 91 00

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 cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Action Submittal:
 - 1. Design Mixtures: For each concrete mixture.

1.4 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Comply with the following sections of ACI 301, unless modified by requirements in the Contract Documents:
 - 1. "General Requirements."
 - 2. "Formwork and Formwork Accessories."
 - 3. "Reinforcement and Reinforcement Supports."
 - 4. "Concrete Mixtures."
 - 5. "Handling, Placing, and Constructing."
 - 6. "Lightweight Concrete."
- C. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Furnish formwork and formwork accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class C or F.
- B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
 - 3. Do not use fine or coarse aggregates containing substances that cause spalling.
- C. Water: Potable and complying with ASTM C 94/C 94M.

2.4 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 CONCRETE MIXTURES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 - 1. Minimum Compressive Strength: as indicated on the Drawings (3000 psi minimum) at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
 - 3. Slump Limit: 4 inches, plus or minus 1 inch.
 - 4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Pozzolan: 25 percent.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - 1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch. Repeat grooving of

contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

2. **Sawed Joints:** Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. **Isolation Joints:** Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.5 CONCRETE PLACEMENT

- A. Comply with ACI 301 for placing concrete.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- C. Do not add water to concrete during delivery, at Project site, or during placement.
- D. Consolidate concrete with mechanical vibrating equipment.

3.6 FINISHING FORMED SURFACES

- A. **Smooth-Formed Finish:** As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.
 1. Apply to concrete surfaces exposed to public view.
- B. **Related Unformed Surfaces:** At tops of walls, horizontal offsets, and similar unformed surfaces 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 unformed surfaces, unless otherwise indicated.

3.7 CONCRETE PROTECTING AND CURING

- A. **General:** Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.
- B. **Evaporation Retarder:** Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. **Curing Methods:** Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
 1. **Moisture Curing:** Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.

- b. Continuous water-fog spray.
- c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
- 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections in accordance with section 014000 "Quality Requirements".
- B. Tests: Perform according to ACI 301.
 - 1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - 2. Testing Frequency: One composite sample shall be obtained for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.

3.9 REPAIRS

- A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION 033053

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes Steel framing and supports for mechanical and electrical equipment. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
 - 2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.3 RELATED REQUIREMENTS

- A. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.

1.4 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 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. 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:
- B. Steel framing and supports for mechanical and electrical equipment.
- C. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

- B. Welding Qualifications: Qualify procedures and personnel according to 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."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 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. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- D. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Provide stainless-steel fasteners for fastening aluminum.
- C. Provide stainless-steel fasteners for fastening stainless steel.
- D. Provide stainless-steel fasteners for fastening nickel silver.
- E. Provide bronze fasteners for fastening bronze.
- F. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- G. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.
- H. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy [Group 1] [Group 2].
- I. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

- J. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- K. Anchors, General: 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 E 488/E 488M, conducted by a qualified independent testing agency.
- L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
- N. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
- O. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy [Group 1] [Group 2] stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- P. 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 B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.3 MISCELLANEOUS MATERIALS

- A. Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- 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 D 1187/D 1187M.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. 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.

2.4 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.

2.5 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. Galvanize miscellaneous framing and supports where indicated.

2.6 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.

2.7 FINISHES, GENERAL

- 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.

2.8 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer.
- 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 Items: SSPC-SP 3, "Power Tool Cleaning."
- 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.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING 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.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the 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.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 033053

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. Penetrations in fire-resistance-rated walls.
 - 2. Penetrations in horizontal assemblies.
 - 3. Penetrations in smoke barriers.
- B. Firestopping, materials and installation details shall be project and application specific and shall form an effective barrier against the spread of fire while maintaining the integrity of fire rated and smoke tight construction. Systems shall be used for sealing through-penetrations of Fire Rated Assemblies and unrated smoke-tight assemblies.
- C. Coordination firestopping and penetration requirements with the work of all other divisions.

PART 2 - SUBMITTALS

- A. Drawings: For each unique situation, submit Manufacturer's detail drawings and applicable UL or FM system numbers for Firestop Systems to be installed.
- B. Installation Instructions: For 2 Hr., 1 Hr., and 20 Min. smoke barrier, submit Manufacturer's installation instructions for each unique Firestop System to be installed.
- C. Product Data: Submit Manufacturer's printed data sheet for all products used in the Firestop System, a recommendation shall be obtained from the Manufacturer, in writing, for the specific application.
- D. Manufacturer's Letters: For installations or configurations not covered by a Firestop System, a recommendation shall be obtained from the Manufacturer, in writing, for the specific application.
- E. Contractor Experience: Contractor shall show evidence of having previously firestopped similar types of construction.

2.2 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

2.3 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced personnel in installing penetration firestopping similar in material, design, and extent required for this project. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements.
- B. Firestopping products shall be UL listed and approved for intended application and use.

2.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means to ventilate or, where this is inadequate, forced-air circulation.
- C. Do not proceed with installation of Firestop Systems when job site conditions are outside the limits permitted by the Manufacturer.
- D. Do not use materials that show signs of damage.
- E. Do not use materials that are beyond their shelf life.

2.5 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials to the site in Manufacturer's original, unopened containers with labels indicating brand and type, and bearing UL label.
- B. Storage: Store materials in accordance with the Manufacturer's directions and recommendations.
- C. Material Safety Data Sheets will be available on the job site for all materials. Follow Manufacturer's guidelines for use and handling.

2.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

2.7 SEQUENCING AND SCHEDULING

- A. Sequence: Perform work of this and other sections in proper sequence to prevent damage to the Firestop Systems and to ensure that their installation will occur prior to enclosing or concealing work.
- B. Install all Firestop Systems after voids and joints are prepared sufficiently to accept the applicable Firestop System.
- C. Do not cover Firestop Systems until they have been properly inspected and accepted by the authority having jurisdiction and Engineer.

2.8 WARRANTIES

- A. Contractor shall warrant the Firestop Systems, where installed in conformance with the listed Firestop System and the Manufacturer's recommendations. Contractor shall repair or replace, within one year, any systems not properly installed.

PART 3 - PRODUCTS

3.1 MANUFACTURERS

- A. Manufacturers: Subject to meeting all firestop system requirements provide one of the following:
 - 1. Hilti, Inc.
 - 2. 3M Fire Protection Products.
 - 3. RectorSeal

3.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist 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.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- C. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- E. Low-Emitting Materials: Penetration firestopping sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- F. 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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

3.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. 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.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

3.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping 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 4 - EXECUTION

4.1 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.

4.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping 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.
 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: 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.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

4.3 INSTALLATION

- A. General: Install penetration firestopping 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 fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 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.

4.4 FIELD QUALITY CONTROL

- A. Contractor shall inspect firestopping and shall not enclose work until the authority having jurisdiction has inspected the work.
- B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

4.5 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 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 is 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 and install new materials to produce systems complying with specified requirements.

4.6 PENETRATION FIRESTOPPING SCHEDULE

- A. Provide firestopping of the following assemblies unless indicated otherwise:
 - 1. Floor/ceiling assemblies - 1 HOUR.
 - 2. Stair tower enclosures - 2 HOURS.
 - 3. Storage room - 1 HOUR
 - 4. Boiler and Mechanical Rooms - 1 HOUR
 - 5. Fire zone walls- 2 HOURS
 - 6. Egress Corridors – 1 HOUR
 - 7. UNRATED SMOKE-TIGHT construction includes wall assemblies not specifically indicated as fire rated as follows:
 - a. All walls separating office or partitions from any other interior space.
 - b. Designated smoke partitions or barriers as indicated on existing architectural plans.
- B. Firestopping materials/construction shall maintain the fire rating of the wall/floor assembly being penetrated and ensure smoke tight construction.
- C. Smoke tight construction shall be treated as one-hour rated construction for the purpose of properly applying firestopping materials in accordance with manufacturer's instructions.

END OF SECTION 078413

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PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Addition of sprinklers to 3 fan rooms into which boilers will be installed as a part of this project. Building is equipped with an existing standpipe system and partial sprinkler protection. Existing system is equipped with an Automatic Fire Pump System.
- B. Additions to the fire protection system shall be hydraulically designed and complete and finished in all respects, tested, approved by authority having jurisdiction and the insurance rating organization, and ready for operation.
- C. The fire protection system includes, but is not limited to, the following:
 - 1. Sprinkler piping and trim.
 - 2. Upright or sidewall heads in exposed piping areas and pendant heads in concealed piping areas finished with suspended acoustical, gypsum or plaster ceilings. Piping shall be concealed in all finished spaces, unless noted otherwise. Piping shall be connected to nearest system riser on each floor with boilers installed as a part of this project.
 - 3. Painting of sprinkler piping and applicable components.
 - 4. System provided for boiler rooms only.
 - 5. All cutting, patching and painting of architectural surfaces incidental to the work.
- D. Use performance of standpipe flow testing (with fire pump operating) for water supply data to be used in hydraulic calculations. This data is available from the agency

1.2 RELATED WORK

- A. General Contractor
 - 1. All chases and soffits required to conceal sprinkler piping.
- B. Electrical Contractor
 - 1. All fire alarm control wiring associated with flow-switches and supervisory contacts.

1.3 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.
 - 1. ASME/ANSI A17.1- 1990 (Errata 1991) (Addenda 1991 and 1992) (Errata 1993) Safety Code for Elevators and Escalators
 - 2. AWWA C651 - 1992 Disinfecting Water Mains
 - 3. FM P7825- 1993 Approval Guide
 - 4. NFPA 13 -1999 Installation of Sprinkler Systems
 - 5. NFPA 14 - 1990 Standpipe and Hose Systems

6. NFPA 24 - 1995 Installation of Private Fire Service Mains and Their Appurtenances
7. NFPA 70 - 1993 National Electrical Code
8. UL FPED - 1993 Fire Protection Equipment Directory
9. UL 262 - 1988 (R 1991) Gate Valves for Fire-Protection Service
10. UL 789 - 1987 (R 1990) Indicator Posts for Fire-Protection Service

1.4 DESIGN STANDARDS

- A. Contract drawings and shop drawings of all trades are hereby made a part of this section for purposes of coordination. Sprinkler subcontractor shall obtain these drawings from the general contractor, and meet with other subcontractors as necessary for proper coordination of utility placement before preparing sprinkler system shop drawings.
- B. Examine drawings and work in progress of other trades. Do not create trade conflicts by laying out or installing sprinkler system components and piping without regard for the space requirements for pipe, raceway or ducts of other trades. Trade conflicts shall be corrected by the Contractor at the Contractor's expense.
- C. Examine full architectural and structural sets of contract drawings to gain full understanding of building characteristics which influence sprinkler system design paying particular attention to ceiling profiles and the need for extra sprinklers due to architectural or structural obstacles. The fire protection contract drawings are not intended to provide this level of detail.

1.5 SPECIAL INSTRUCTIONS

- A. Sprinkler system additions shall be wet pipe, hydraulic design based on a mixed I-2 occupancy with hazard levels as shown on the Drawings. All design, construction and sizing shall conform to the requirements of NFPA Bulletin #13, 20, and 24, the Local Fire Marshal, the Insurance Underwriter, and any other authority having jurisdiction. Nothing in these contract documents shall be construed as intent to fall short of complete compliance with any applicable code or standard.
- B. Contractor shall conduct his/her own hydrant flow test and use this data for the hydraulic calculations. Data provided on Drawings shall not be used as a basis for the hydraulic design.
- C. Coordinate hydraulic calculations with hydrant flow test data and performance of existing fire pump. Carefully select sprinklers and layout pipes so as not to exceed water delivery capability of fire pump or water system.
- D. Include in the hydraulic calculations a 8 psi water supply safety factor.

1.6 SUBMITTALS

- A. Contractor shall make his own 1/4" = 1' working drawings giving the following information:
 1. Location of all pertinent mechanical and electrical equipment.
 2. Location of fire walls.
 3. Ceiling construction.

4. Full height cross sections as required.
 5. Location of partitions, stairs, etc.
 6. Include plan showing routing of fire line to connection with existing riser.
 7. Make and type of sprinklers and temperature rating.
 8. Number of sprinklers on each riser and on each floor.
 9. Total area protected on each floor.
 10. Make, type, model and size of flow switch and all other valves required.
 11. All fittings and sizes.
 12. Type of hangers, inserts and sleeves, and seismic protection.
 13. All drains and test pipes.
 14. Cutting lengths of pipe.
 15. Elevations of pipe lines.
- B. Working Drawings shall be complete and are to be submitted with hydraulic calculations for approval by Engineer, insurance rating organization, local Fire Marshal, and any other authority having jurisdiction. Submit complete information on hydraulic calculation software used. Include input as well as output. Provide professional engineering seal on all Drawings and on calculations. Do not begin construction until all approvals have been obtained.
- C. Submit shop drawings, hydraulic calculations and product data on all manufactured items and materials. Contractor shall make his own arrangements for transmitting submittals to the insurance rating organization and arrange for their review comments to be transmitted to the Engineer.
- D. After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes. Submit 24- by 36-inch drawings on reproducible mylar film with title block similar to full size contract drawings.

1.7 SPRINKLER SYSTEM DESIGN

- A. Design automatic wet fire extinguishing sprinkler systems in accordance with the required and advisory provisions of NFPA 13, by hydraulic calculations for uniform distribution of water over the design areas. Each system shall include materials, accessories, and equipment inside and outside the building to provide each system complete and ready for use. Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed working drawings to be submitted for approval. Locate sprinkler heads in a consistent pattern with ceiling grid, lights, and air supply diffusers. Provide sprinkler heads and piping system layout. Devices and equipment for fire protection service shall be UL FPED listed or FM P7825 approved for use in wet pipe sprinkler systems. Design systems for earthquake protection.
- B. Location of Sprinklers
1. Sprinklers in relation to the ceiling and the spacing of sprinklers shall not exceed that permitted by NFPA 13 for indicated occupancy hazard of each space. Uniformly space sprinklers on the branch piping. Provide sprinklers in all concealed spaces of combustible construction as required by NFPA 13. Such spaces include but are not limited to; truss

spaces under roofs and spaces under raised platforms. Provide dry system in areas subject to freezing.

C. Water Distribution

1. Distribution shall be uniform throughout the area in which the sprinkler heads will open. Discharge from individual heads in the hydraulically most remote area shall be 100 percent of the required density.

1.8 QUALIFICATIONS OF INSTALLER

- A. Prior to installation, submit data showing that the Contractor has successfully installed systems of the same type and design as specified herein. Data shall include names and locations of at least two installations where the Contractor, or the subcontractor referred to above, has installed such systems. Indicate type and design of each system and certify that each system has performed satisfactorily in the manner intended for not less than 18 months.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Sprinklers, Alarm Valves & Trim, Check Valves

1. GEM
2. Viking
3. Star
4. Central
5. Reliable

B. Gate valves

1. Mueller
2. Kennedy

C. Mechanical grooved pipe couplings

1. Victaulic
2. ITT Grinnell

D. Tamper and Flow Switches

1. Potter
2. Approved Equal

E. Firestopping

1. Dow Corning
2. General Electric
3. 3M

4. Hilti

2.2 MATERIALS

A. Aboveground Piping Systems

1. Provide fittings for changes in direction of piping and for connections. Make changes in piping sizes through tapered reducing pipe fittings; bushings will not be permitted. Perform welding in the shop; field welding will not be permitted. Conceal piping in areas with suspended acoustical ceiling and suspended gypsum board or plaster ceilings.

B. Sprinkler Piping

1. NFPA 13, except as modified herein. Steel piping 2" and smaller shall be Schedule 40 and steel piping larger than 2" shall be Schedule 10 or 40. Fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded shall be welded, threaded, or grooved-end type. Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into the pipe when pressure is applied will not be permitted. Rubber gasketed grooved-end pipe and fittings with mechanical couplings shall be permitted in pipe sizes 1.5 inches and larger. Fittings shall be UL FPED listed or FM P7825 approved for use in wet pipe sprinkler systems. Fittings, mechanical couplings, and rubber gaskets shall be supplied by the same manufacturer. Steel piping with wall thickness less than Schedule 40 shall not be threaded. Side outlet tees using rubber gasketed fittings shall not be permitted. Sprinkler pipe and fittings shall be metal.

C. Sprinklers

1. Provide nominal 0.50-inch orifice UL/FM approved quick response sprinklers except where indicated. Release element of each head shall be of the temperature rating suitable for the specific application.
2. Quick Response Pendent type, concealed with white drop-off plate.
3. Quick Response Upright type, natural brass finish in basement and attic, chrome plated on first floor.

D. Cabinet

1. Provide metal cabinet with extra sprinklers and sprinkler wrench adjacent to each alarm valve. The number and types of extra sprinklers shall be as specified in NFPA 13.

E. Valves

1. Provide UL/FM valves of types approved for fire service. Gate valves shall open by counterclockwise rotation. Provide a rising stem OS&Y valve on inlet and outlet of reduced pressure backflow preventer and beneath each alarm valve as shown on the Drawings. Check valves shall be flanged clear opening swing-check type with flanged inspection and access cover plate for sizes 4 inches and larger. Provide gate valve tamper switches as shown on Drawings.

F. Valve Tamper Switch

1. Provide valve tamper switch(es) to monitor the open position of valve(s) controlling water supply to the sprinkler system. Switch contacts shall transfer from the normal (valve open) position to the off-normal (valve closed) position during the first two revolutions of the hand wheel, or when the stem of the valve has moved not more than one-fifth of the

distance from its normal position. Switch shall be tamper resistant. Removal of the cover shall cause switch to operate into the off-normal position.

G. Inspector's Test Connection

1. Provide test connections approximately 6 feet above the floor for each sprinkler system or portion of each sprinkler system equipped with an alarm device; locate at the hydraulically most remote part of each system. Provide test connection piping to a location where the discharge will be readily visible and where water may be discharged without property damage. Provide discharge orifice of same size as corresponding sprinkler orifice.

H. Drains

1. Provide auxiliary drains as required by NFPA 13.

I. Identification Signs

1. NFPA 13. Attach properly lettered and approved metal signs to each valve and alarm device. Permanently affix hydraulic design data nameplates to the riser of each system.

J. Escutcheon Plates

1. Provide split hinge metal plates for piping entering walls, floors, and ceilings in exposed spaces. Provide polished stainless steel plates or chromium-plated finish on copper alloy plates in finished spaces. Provide paint finish on metal plates in unfinished spaces.

K. Hangers and Support Installation

1. All hangers to be of approved type, metal pipe rings, rods and inserts, one hanger for each length of pipe between sprinkler heads on branch lines and at least one hanger for every 12 feet of pipe on mains.
2. Support, anchor, and guide piping systems to withstand static and dynamic load conditions; to allow for expansion and contraction; to prevent vibration and swaying; to maintain alignment and minimize vertical deflection.

L. Pipe Sleeves

1. Provide where piping passes entirely through walls, floors, and roofs. Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, and roofs. Provide one-inch minimum clearance between exterior of piping and interior of sleeve or core-drilled hole. Firmly pack space with mineral wool insulation. Seal space at both ends of the sleeve or core-drilled hole with plastic waterproof cement which will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric seal.
2. In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with UL listed firestopping.
 - a. Sleeves in Masonry and Concrete Walls, Floors, and Roofs: Provide hot-dip galvanized steel, ductile-iron, or cast-iron sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.
 - b. Sleeves in Other Than Masonry and Concrete Walls, Floors, and Roofs: Provide 26 gage galvanized steel sheet.

M. Firestopping Material

1. Fire stopping materials/construction shall maintain the fire rating of the wall/floor assembly being penetrated.
2. Firestopping material and installation shall constitute a listed U/L assembly for the specific wall/floor construction and the penetrating material. "Listed" shall mean specifically listed in the 1990 U/L Fire resistance Directory under "Through-Penetration Firestop Systems (XHEZ)."
3. Firestopping material shall be asbestos-free and provide a U/L "F" rating equal to that of the floor/wall assembly penetrated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with NFPA 13, except as modified herein. Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings. Keep the interior and ends of new piping and existing piping affected by Contractor's operations thoroughly cleaned of water and foreign matter. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter. Inspect piping before placing into position. Provide Teflon pipe thread paste on male threads.

B. Pipe and Fittings

1. In joining pipe and fittings, care should be taken that pipes do not extend into fitting to reduce the waterway. All pipes to be reamed after cutting to remove all burrs and fins. Mains or risers may be shop welded in accordance with NFPA 13.
2. Screwed: Screw threaded items up close to shoulders with not more than three incomplete threads exposed. Do not use lampwick, cord, wool, or other "wicking" materials. Repair leaks with new materials, do not peen or caulk. "Teflon" pipe joint tape or joint compounds composed of red lead and graphite ground in linseed oil will be permitted applied to male threads only.
3. Flanged: Assemble joints with gaskets and American Standard carbon steel bolts and hex nuts, take up with torque limiting wrench.
4. Grooved pipe: Groove pipe using pipe grooving equipment and methods approved by coupling manufacturer. Do not use grooved pipe where exposed in finished spaces.

C. Hangers and Support Installation

1. All hangers to be of approved type, metal pipe rings, rods and inserts, one hanger for each length of pipe between sprinkler heads on branch lines and at least one hanger for every 12 feet of pipe on mains.
2. Support, anchor, and guide piping systems to withstand static and dynamic load conditions; to allow for expansion and contraction; to prevent vibration and swaying; to maintain alignment and minimize vertical deflection.

3. Exercise care in locating and placing supporting devices so that strength of structure is not weakened or impaired. Do not support piping from other piping or ductwork. Do not use wire, tape, metal bands, or other make-shift devices as means of support or fastening.
 4. Provide lateral and longitudinal sway bracing in accordance with 6-4.5 NFPA-13.
 5. Provide swing joints and flexible couplings in accordance with 6-4 NFPA-13.
- D. Auxiliary Steel
1. All auxiliary steel necessary to assure proper hanging and bracing to be supplied by this Contractor.
- E. Flushing
1. Provision shall be made for flushing system by installing 2" x 4" nipple and cap at end of each cross main. Flush underground and lead-in piping connections prior to connection with sprinkler risers.
- F. Return Bends
1. Return bends shall be used for connection of pendant sprinklers to branch lines. Return bends shall be connected to the top of branch lines in order to avoid accumulation of sediment in the drop nipples.
- G. Sprinkler Guards
1. All sprinkler heads under stairs, in closets or so located to subject them to traffic damage, shall be protected with approved sprinkler guards.
- H. Spare Head Cabinet
1. This contractor shall furnish and install a spare head cabinet, including a wrench, and spare sprinkler heads, of all types, degree rating and orifice sizes installed. Number of spare heads as required by NFPA 13.
 2. Provide additional drains at all low points created by offsets.
- I. Firestopping
1. Firestop pipe penetrations according to instructions of manufacturer of firestopping material and the configuration of the U/L listing.
- J. Disinfection
1. Disinfect the new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 to 0.5 parts per million, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit results prior to the new water piping being placed into service. Disinfection of systems supplied by nonpotable water is not required.

3.2 COORDINATION OF TRADES

- A. Lay out system in coordination with the contract documents and shop drawings of electrical, plumbing, and mechanical trades. Do not create trade conflicts by installing sprinkler system material in spaces needed for pipe, conduit and ducts. Coordinate pipe routing through general contractor. Coordinate head pattern, density and placement being aware of obstacles created by light fixtures, HVAC, architectural elements, etc.

3.3 FIELD QUALITY CONTROL

- A. Test all new piping hydrostatically at not less than 200# per square inch pressure for two hours, and replace all defective material.
- B. The inside sprinkler piping shall be installed in such a manner that there will be no visible leakage when the system is subjected to the hydrostatic pressure test.
- C. Tests shall be performed by a representative of the authority having jurisdiction, at the inspector's test connection to insure that a water flow in the system equal to or greater than the flow of one sprinkler head shall operate the alarm system. Provide test certificates to Owner.
- D. Backflow preventer assembly shall be tested by a certified tester on initial installation. Provide backflow preventer test certificate in operation and maintenance manuals.

3.4 FIELD PAINTING

- A. Clean, pretreat, prime, and paint new fire extinguishing sprinkler systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories. Apply coatings to clean, dry surfaces, using clean brushes. Clean the surfaces to remove dust, dirt, rust, and loose mill scale. Immediately after cleaning, provide the metal surfaces with one coat of pretreatment primer applied to a minimum dry film thickness of 0.3 mil, and one coat of zinc molybdate primer applied to a minimum dry film thickness of 1.0 mil. Shield sprinkler heads with protective covering while painting is in progress. Upon completion of painting, remove protective covering from sprinkler heads. Remove sprinkler heads which have been painted and replace with new sprinkler heads.
- B. Piping in Unfinished Areas
 - 1. Provide primed surfaces with one coat of red alkyd gloss enamel applied to a minimum dry film thickness of 1.0 mil in attic spaces, spaces above suspended ceilings, crawl spaces, pipe chases, mechanical equipment room, and spaces where walls or ceiling are not painted or not constructed of a prefinished material. In lieu of red enamel finish coat, provide piping with 2-inch wide red enamel bands or self-adhering red plastic bands spaced at maximum of 20-foot intervals.
- C. Piping in Finished Areas
 - 1. Provide primed surfaces with two coats of paint to match adjacent surfaces, except provide valves and operating accessories with one coat of red alkyd gloss enamel applied to a minimum dry film thickness of 1.0 mil. Provide piping with 2-inch wide red enamel bands or self-adhering red plastic bands spaced at maximum of 20-foot intervals throughout the piping systems.

END OF SECTION 211313

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. General requirements for HVAC work.
 - 2. Equipment installation requirements common to equipment sections.
 - 3. Supports and anchorages.

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division 1 and 230500.
 - 1. Furnish complete catalog data for materials and manufactured items of equipment to be used in the Work to Architect for review within 30 days after award of Contract.
 - 2. Submit eight copies of data in binders and index in same order and name as they appear in Specification.
 - 3. State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information.
 - 4. List on catalog covers page numbers of submitted items.
 - 5. Underline applicable data.
 - 6. If material or equipment is not as specified or submittal is not complete, it will be rejected by Engineer.

- B. Operation and Maintenance Manual for HVAC Systems
 - 1. Bind Operation and Maintenance Manual for Mechanical Systems in a hard-backed binder. Label binder identifying owner, name of project, contractor's name and date.
 - 2. Provide a master index at beginning of Manual showing items included. Use plastic tab indexes for sections of Manual.
 - 3. First section shall consist of name, address, and phone number of Mechanical and Electrical Engineers, General Contractor, and Mechanical, Temperature Control, and Electrical Contractors. Also include a complete list of equipment installed with name, address and phone number of vendor.
 - 4. Provide a section for each type of item of equipment.
 - 5. Submit three copies of Operation & Maintenance Manual to Engineer for his approval. Use one of these approved copies during final inspection and leave with Owner.
 - 6. Include descriptive literature (Manufacturer's catalog data) of each manufactured item. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 7. Operating instructions shall include:
 - a. General description of each HVAC system.
 - b. Step-by-step procedure to follow in putting fixture and each piece of HVAC equipment into operation.
 - c. Schematic control diagrams for each control panel, etc. Each diagram shall show locations of start-stop switches, insertion thermostats, room thermostats,

- thermometers, firestats, pressure gauges, automatic valves, and accessories. Mark correct operating settings for each control instrument on these diagrams.
 - d. Diagram for electrical control system showing wiring of related electrical control items such as firestats, fuses, interlocks, electrical switches, and relays.
 - e. A drawing of each control panel identifying components on the panels and their function.
8. Maintenance instructions shall include:
- a. Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
 - b. List of HVAC equipment used indicating name, model, serial number, and name plate data of each item together with number and name associated with each system item.
 - c. Balance and Test Run Reports.
 - d. Instruct Owner in operation and maintenance of HVAC systems utilizing Operation and Maintenance Manual when so doing.
 - e. Include copies of all manufacturer's warranties
- C. Shop Drawings
- 1. Provide shop drawings according to the requirements of Division 1 and where specified in other Sections of this Division.

1.4 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

1.5 WARRANTY

- A. In addition to guarantees specified in General Conditions and other sections of Division 23, guaranty, HVAC system to be free from noise in operation that may develop as a result of failure to construct system in accordance with Contract Documents. In order to be protected, secure proper guarantees from suppliers and subcontractors.
- B. See Division 1 for additional warranty requirements.

1.6 FINAL ACCEPTANCE

- A. The Contractor is responsible for conducting a preliminary inspection to determine if all work is complete. After verification, the Contractor shall provide the Engineer with written notice that the work is complete. The Engineer shall schedule an initial and follow-up visit to verify that the work has been completed in conformance with the contract documents. The Engineer shall prepare a formal punch list of any items considered incomplete, and distribute to the Architect, Owner, and Contractor. The Engineer will then schedule another field visit to verify the work is

complete. If the work is not complete, the cost for additional field visits to verify that the work is complete shall be billed to the Contractor at the rate of \$150.00 per hour.

1.7 COORDINATION

- A. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. The HVAC systems design is based on the manufacturer of equipment, devices, fixtures and accessories as scheduled or otherwise specified within the contract documents.
- B. Equivalent equipment, devices and accessories from the acceptable manufacturers listed within each section of this specification as acceptable may be accepted if the proposed equipment, devices, fixtures and accessories meet or exceed the requirements of this specification and the capacity and other requirements shown on the drawings. Inclusion in the list of the manufacturers does not guarantee the listed manufacturer can furnish an acceptable product for this project. The Engineer is the sole arbiter of equivalence and acceptability.
- C. If, in the opinion of the Engineer, the use of a specific piece of equipment, device, fixture or accessory of a manufacturer listed as acceptable requires additional electrical capacity or circuitry which adds to the cost of the Division 26 work, the proposed equipment, fixture, device, or accessory will be rejected unless Division 23 arranges for the additional electrical work to be provided at no cost to the owner.
- D. If, in the opinion of the Engineer, the use of a specific piece of equipment, device or accessory of a manufacturer listed requires additional structural analysis, architectural design services and/or changes to structural steel or the work of any other trade resulting from differences in dimensions, weight or weight distribution between the proposed equivalent unit and the unit upon which the mechanical design was based, the unit will be rejected unless Division 22 arranges for the additional structural engineering, architectural design and/or steel work or work of other trades to be provided at no cost to the owner. The unit will also be rejected if in the opinion of the Architect, the changes required for proper installation of the equivalent unit are not in the best interest of the project or the Owner.

2.2 SUBSTITUTIONS

- A. See Specification Section 01 25 00, "Substitution Procedures".

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS FOR HVAC WORK

- A. Furnish labor, materials, and equipment necessary for completion of work unless indicated or noted otherwise.

- B. Be responsible for proper operation of electrical power equipment furnished by this Division.
- C. Furnish exact location of electrical connections and complete information on motor controls to Division 26
- D. Put HVAC system into full operation and continue its operation during each working day of testing and balancing.
- E. Make changes in pulleys, belts, valves and dampers or add dampers as required for correct air and fluid flow balance at no additional cost to Owner.
- F. Be responsible for required cutting and patching incidental to work of this Division and make required repairs afterward to satisfaction of Architect and Engineer. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses. Cutting methods shall be restricted to core drilling of walls and saw cutting or core drilling of floors. Use of any other method shall first be approved by Architect and Engineer.
- G. Adjust locations of ducts, equipment, fixtures, etc., to accommodate work from interferences anticipated and encountered. Determine exact route and location of each duct or pipe prior to fabrication.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.

3.4 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

- C. Attach to substrates as required to support applied loads.

END OF SECTION 230500

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PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Selective removal and disposal of existing HVAC equipment, ductwork, piping and controls as shown or otherwise indicated on the drawings.
- B. Retain portions of the HVAC system for reuse as shown or otherwise indicated on the drawings.
- C. Coordinate removals with existing conditions, new work, work from other divisions and the owner.
- D. The Contractor shall be responsible for removal, and unless otherwise indicated, the disposal of Mercury prior to demolition or general renovation, from all areas where renovation or demolition operations will disturb the material. Typically Mercury is found in wall-mounted thermostats, thermometers of wall mounted thermostats, and in mercoid switches, manometers, etc. for various HVAC equipment and devices.
- E. The Contractor shall be responsible for coordinating the activities of all trades to prevent the above mentioned materials from being disposed of as general waste. All costs associated with separating the above mentioned hazardous materials, including fines for illegal transport or disposal, are the responsibility of the Contractor.
- F. Refrigerant recovery and removal from site as part of all refrigeration equipment disposals. (All equipment and devices containing refrigerants).

1.2 PROJECT CONDITIONS

- A. Heating, cooling & ventilation shall be maintained in all occupied areas of building during construction.
- B. Contractor shall coordinate any and all disruption of HVAC service with the owner in writing 2 weeks prior to dismantling, disconnecting or shutdown of any portion of the existing HVAC system.
- C. Contractor shall maintain operation of the heating system throughout the entire heating season - October 1 through April 30.

1.3 QUALITY ASSURANCES

- A. Only the best of workmanship in accordance with present standards and generally accepted construction practices will be acceptable. Any work which the workmanship is judged by the Engineer to be below the present standards or generally accepted construction practices shall be replaced with properly done work at the Contractor's expense.

1.4 SITE CONDITIONS

- A. The Drawings shall be taken in a sense as diagrammatic. Locations of mechanical and electrical equipment are not intended to show every offset and fitting, nor every obstruction difficulty that may be encountered.

- B. It is the responsibility of the Contractor to inspect all work areas for mercury sources, and to notify all workmen of the importance of proper handling of materials containing mercury.
- C. It is the responsibility of the Contractor to inspect all work areas for refrigerant sources, and to notify all workmen of the importance of proper procedure for removing equipment containing refrigerants.
- D. It is the responsibility of the Contractor to inspect and identify any and all liquids requiring drainage and to understand where and how liquids may be drained.

1.5 PROJECT CONTROL

- A. The Contractor shall ensure no debris from demolition or construction remains at the close of each workday and that work areas adjacent to the work area are maintained in a safe and useable condition.
- B. The Contractor shall ensure that no hazardous materials are stored on site. All drums and containers used as required by these specifications shall be removed from site at the close of each workday and areas adjacent to the work area are maintained in a safe and useable condition.

1.6 SEQUENCING AND SCHEDULING

- A. All piping to be completely drained prior to commencing demolition.
- B. All power to equipment being removed shall be disconnected by electrical contractor prior to commencing demolition.
- C. Schedule and coordinate demolition with new construction to minimize frequency and duration of work in occupied areas.
- D. Schedule and coordinate removal of hazardous materials and refrigerants to ensure demolition work is executed smoothly without frequent interruptions and to minimize frequency and duration of work in occupied areas.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide all necessary materials and equipment, labor and training to perform the work of this section.

2.2 WASTE CONTAINERS

- A. Waste containers shall meet EPA and local standards.

2.3 EQUIPMENT

- A. Provide all tools and equipment necessary to perform the work of this section.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field conditions prior to commencing work. Report discrepancies to Engineer before disturbing existing installation.
- B. Beginning of demolition means installer accepts existing conditions.
- C. Premature or excessive demolition or failure to retain components of the existing systems shall result in the Contractor providing replacement at no additional cost to Owner.

3.2 MERCURY

- A. Mercury may be found in wall mounted thermostats, thermometers or wall mounted thermostats or in mercooid switches, manometers, etc. for HVAC equipment. Inspect all work areas for the presence of mercury sources. Remove (intact) all equipment that contains mercury without exposing the mercury to atmosphere.
- B. Place all mercury containing materials in EPA approved drums with locking tops for recycling or disposal. Pad the drums to prevent the spillage of mercury. Provide drums, EPA labels and delivery services to an EPA approved recycling facility or landfill for all steel drums that contain mercury.
- C. If mercury is spilled from its enclosure onto furnishings, floors or any open area of the building, the Contractor shall hire a professional toxic spill company to come and properly remove the mercury. All costs related to a mercury spill are the responsibility of the Contractor.

3.3 PREPARATION

- A. Drain piping as described above.
- B. Disconnect electrical power as described above.

3.4 REMOVAL

- A. Remove and dispose of existing mechanical materials and equipment as shown in Drawings subject to the limitations described elsewhere in the contract documents.
- B. Coordinate demolition of existing equipment with all other subcontractors to avoid any conflicts which may affect safety, cost to the owner, or schedule.

3.5 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused and are being addressed by the modifications indicated on the drawing set.

END OF SECTION 230510

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements for polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

1.4 SUBMITTALS

- A. Product data and installation instructions on all materials shall be submitted to Engineer for approval.
- B. Submit test results verifying minimal efficiency and power factor for three phase motors larger than 1/2 horsepower.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Division 1.
- B. Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacture of electric motors for commercial/industrial use, and their accessories, with minimum three years documented product development, testing, and manufacturing experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.8 WARRANTY

- A. Provide five year manufacturer's warranty.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.
- B. Comply with NEMA MG 1 unless otherwise indicated.
- C. Comply with IEEE 841 for severe-duty motors.
- D. All motors provided on this project shall be NEMA inverter duty, premium efficiency.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- C. Visible Nameplate: Indicate motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, Service Factor, Power Factor, efficiency.

2.3 POLYPHASE MOTORS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers:
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.
- D. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 – EXECUTION

- A. Provide new belts.
- B. Align drive and adjust belt tension.
- C. Test run at VFD output of 60HZ. Measure current and adjust or change sheaves to avoid overloading.

END OF SECTION 230513

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Stack-sleeve fittings.
 - 3. Sleeve-seal systems.
 - 4. Sleeve-seal fittings.
 - 5. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

2.2 STACK-SLEEVE FITTINGS

- 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. Smith, Jay R. Mfg. Co.
2. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

B. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

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. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. Metraflex Company (The).
4. Pipeline Seal and Insulator, Inc.
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: **EPDM-rubber** interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: **Carbon steel**.
3. Connecting Bolts and Nuts: **Stainless steel** of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

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. Presealed Systems.

B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide [**1-inch**] <Insert dimension> annular clear space between piping and concrete slabs and walls.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas **2 inches** above finished floor level.
 - 2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."
- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
 - 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
 - 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
 - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 5. Using grout, seal the space around outside of stack-sleeve fittings.
- B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 230517

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. Thermometers.
 - 2. Gages.
 - 3. Test plugs.
- B. Related Sections:
 - 1. Division 23 Section 23 21 13 "Hydronic Piping".

1.3 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated; include performance curves.
- B. Shop Drawings: Schedule for thermometers and gages, indicating manufacturer's number, scale range, location and application for each.
- C. Product Certificates: For each type of thermometer and gage, signed by product manufacturer.
- D. Pressure gauges shall be calibrated in units of pounds per square inch (psi).
- E. Thermometers shall be calibrated in units of degrees of Fahrenheit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Ashcroft
 - 2. Palmer - Wahl Instruments Inc.

3. Terrice, H. O. Co.
4. Weiss Instruments, Inc.
5. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.

2.2 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

- A. Case: Chrome-plated brass, 9 inches long.
- B. Tube: Red or blue reading, organic-liquid filled, with magnifying lens.
- C. Tube Background: Satin-faced, nonreflective aluminum with permanently etched scale markings.
- D. Window: Glass.
- E. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
- F. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
- G. Accuracy: Plus or minus 1 percent of range, or plus or minus 1 scale division to maximum of 1.5 percent of range.

2.3 THERMOWELLS

- A. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

2.4 PRESSURE GAGES – LIQUID FILLED

- A. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
 1. Case: Liquid-filled type, drawn steel or cast aluminum 6-inch diameter.
 2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
 3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
 4. Movement: Mechanical, with link to pressure element and connection to pointer.
 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
 6. Pointer: Red metal.
 7. Window: Glass.
 8. Ring: Stainless steel.
 9. Accuracy: Grade A, plus or minus 1 percent of middle half scale.
 10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
 11. Range for Fluids under Pressure: Two times operating pressure.
- B. Pressure-Gage Fittings:
 1. Valves: NPS 1/4 brass or stainless-steel needle type.
 2. Syphons: NPS 1/4 coil of brass tubing with threaded ends.
 3. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.5 TEST PLUGS

- A. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.
- B. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- C. Core Inserts: One or two self-sealing rubber valves.
 - 1. Insert material for air, water, oil, or gas service at 20 to 200 deg F shall be CR.
 - 2. Insert material for air or water service at minus 30 to plus 275 deg F shall be EPDM.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Install liquid-in-glass thermometers and pressure gauges in piping as shown on the drawings.
- B. Provide the following temperature ranges for thermometers:
 - 1. Heating Hot Water: 30 to 240 deg F, with 2-degree scale divisions.
 - 2. Chilled Water: 0 to 100 deg F, with 2-degree scale divisions.
- C. Provide the following ranges for pressure gauges:
 - 1. Operating pressure shall be mid-span reading, 2 psi scale divisions.

3.2 INSTALLATIONS

- A. Install pressure gages where shown or otherwise indicated by the Contract Documents.
- B. Install thermometers where shown or otherwise indicated by the Contract Documents. Install direct-mounting thermometers and adjust vertical and tilted positions.
- C. Install thermowells with socket extending one-third of diameter of pipe and in vertical position in piping tees where thermometers are indicated.
- D. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- E. Install needle-valve and snubber fitting in piping for each pressure gage for fluids (except steam).
- F. Install test plugs in tees in piping.

3.3 CONNECTIONS

- A. Install gages adjacent to machines and equipment to allow service and maintenance for meters, gages, machines, and equipment.

3.4 ADJUSTING

- A. Adjust faces of gages to proper angle for best visibility.

END OF SECTION 230519

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. Bronze angle valves.
 - 2. Brass ball valves.
 - 3. Bronze ball valves.
 - 4. Iron ball valves.
 - 5. Iron, single-flange butterfly valves.
 - 6. Iron, grooved-end butterfly valves.
 - 7. High-performance butterfly valves.
 - 8. Bronze lift check valves.
 - 9. Bronze swing check valves.
- B. Related Sections:
 - 1. Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.1 for power piping valves.
 - 3. ASME B31.9 for building services piping valves.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to HVAC valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 (DN 200) and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Handlever: For quarter-turn valves NPS 6 (DN 150) and smaller **except plug valves**
 - 4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every [5] **[10] <Insert number>** plug valves, for each size square plug-valve head.
 - 5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.

- E. Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:
 - 1. Gate Valves: With rising stem.
 - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 - 3. Butterfly Valves: With extended neck.

- F. Valve-End Connections:
 - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
 - 2. Grooved: With grooves according to AWWA C606.
 - 3. Solder Joint: With sockets according to ASME B16.18.
 - 4. Threaded: With threads according to ASME B1.20.1.

- G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE ANGLE VALVES

- A. Class 125, Bronze Angle Valves with Bronze Disc:
 - 1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Hammond Valve.
 - b. Milwaukee Valve Company.
 - c. **<Insert manufacturer's name>**.

 - 2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded.
 - e. Stem and Disc: Bronze.
 - f. Packing: Asbestos free.
 - g. Handwheel: Malleable iron[, **bronze, or aluminum**].

- B. Class 125, Bronze Angle Valves with Nonmetallic Disc:
 - 1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. American Valve, Inc.
 - b. NIBCO INC.

 - 2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.

- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Disc: PTFE or TFE.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron[, **bronze, or aluminum**].

C. Class 150, Bronze Angle Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Crane Co.; Crane Valve Group; Stockham Division.
 - b. Kitz Corporation.
2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 300 psig (2070 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem and Disc: Bronze.
 - f. Packing: Asbestos free.
 - g. Handwheel: Malleable iron[, **bronze, or aluminum**].

D. Class 150, Bronze Angle Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. Hammond Valve.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.
 - g. Powell Valves.
2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 300 psig (2070 kPa).
 - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: PTFE or TFE.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron[, **bronze, or aluminum**].

2.3 BRASS BALL VALVES

A. One-Piece, Reduced-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Kitz Corporation.

 2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 400 psig (2760 kPa).
 - c. Body Design: One piece.
 - d. Body Material: Forged brass.
 - e. Ends: Threaded.
 - f. Seats: PTFE or TFE.
 - g. Stem: Brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Reduced.
- B. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. DynaQuip Controls.
 - d. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
 - e. Hammond Valve.
 - f. Jamesbury; a subsidiary of Metso Automation.
 - g. Jomar International, LTD.
 - h. Kitz Corporation.
 - i. Legend Valve.
 - j. Marwin Valve; a division of Richards Industries.
 - k. Milwaukee Valve Company.
 - l. NIBCO INC.
 - m. Red-White Valve Corporation.
 - n. RuB Inc.

 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Brass.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
- C. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
 - d. Hammond Valve.
 - e. Jamesbury; a subsidiary of Metso Automation.
 - f. Kitz Corporation.
 - g. Marwin Valve; a division of Richards Industries.
 - h. Milwaukee Valve Company.
 - i. RuB Inc.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig (1035 kPa).
- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

D. Two-Piece, Regular-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Hammond Valve.
 - b. Jamesbury; a subsidiary of Metso Automation.
 - c. Legend Valve.
 - d. Marwin Valve; a division of Richards Industries.
 - e. Milwaukee Valve Company.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig (1035 kPa).
- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Brass.
- i. Ball: Chrome-plated brass.
- j. Port: Regular.

E. Two-Piece, Regular-Port, Brass Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Jamesbury; a subsidiary of Metso Automation.
 - b. Marwin Valve; a division of Richards Industries.

 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Brass or bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Regular.
- F. Three-Piece, Full-Port, Brass Ball Valves with Brass Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Jomar International, LTD.
 - b. Kitz Corporation.
 - c. Red-White Valve Corporation.
 - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - e. **<Insert manufacturer's name>**.

 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Three piece.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Brass.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
- G. Three-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Jomar International, LTD.
 - b. Kitz Corporation.
 - c. Marwin Valve; a division of Richards Industries.

- d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - e. <Insert manufacturer's name>.
2. Description:
- a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Three piece.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.

2.4 BRONZE BALL VALVES

A. One-Piece, Reduced-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. NIBCO INC.
 - d. <Insert manufacturer's name>.
2. Description:
- a. Standard: MSS SP-110.
 - b. CWP Rating: 400 psig (2760 kPa).
 - c. Body Design: One piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded.
 - f. Seats: PTFE or TFE.
 - g. Stem: Bronze.
 - h. Ball: Chrome-plated brass.
 - i. Port: Reduced.

B. One-Piece, Reduced-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- a. Conbraco Industries, Inc.; Apollo Valves.
 - b. NIBCO INC.
 - c. <Insert manufacturer's name>.
2. Description:

- a. Standard: MSS SP-110.
- b. CWP Rating: 600 psig (4140 kPa).
- c. Body Design: One piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE or TFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Reduced.

C. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. American Valve, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Crane Co.; Crane Valve Group; Crane Valves.
- d. Hammond Valve.
- e. Lance Valves; a division of Advanced Thermal Systems, Inc.
- f. Legend Valve.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Red-White Valve Corporation.
- j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- k. **<Insert manufacturer's name>**.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig (1035 kPa).
- c. CWP Rating: 600 psig (4140 kPa).
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

D. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. Conbraco Industries, Inc.; Apollo Valves.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Hammond Valve.
- d. Lance Valves; a division of Advanced Thermal Systems, Inc.
- e. Milwaukee Valve Company.
- f. NIBCO INC.
- g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

- h. <Insert manufacturer's name>.
2. Description:
- a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.
- E. Two-Piece, Regular-Port, Bronze Ball Valves with Bronze Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.
 - d. Crane Co.; Crane Valve Group; Stockham Division.
 - e. DynaQuip Controls.
 - f. Hammond Valve.
 - g. Lance Valves; a division of Advanced Thermal Systems, Inc.
 - h. Milwaukee Valve Company.
 - i. NIBCO INC.
 - j. <Insert manufacturer's name>.
2. Description:
- a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Bronze.
 - i. Ball: Chrome-plated brass.
 - j. Port: Regular.
- F. Two-Piece, Regular-Port, Bronze Ball Valves with Stainless-Steel Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- a. Conbraco Industries, Inc.; Apollo Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Hammond Valve.

- d. Milwaukee Valve Company.
 - e. <Insert manufacturer's name>.
2. Description:
- a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Regular.
- G. Three-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- a. Conbraco Industries, Inc.; Apollo Valves.
 - b. DynaQuip Controls.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Red-White Valve Corporation.
 - g. <Insert manufacturer's name>.
2. Description:
- a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Three piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Bronze.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
- H. Three-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
- a. Conbraco Industries, Inc.; Apollo Valves.
 - b. Hammond Valve.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. <Insert manufacturer's name>.

2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig (1035 kPa).
 - c. CWP Rating: 600 psig (4140 kPa).
 - d. Body Design: Three piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Stainless steel.
 - i. Ball: Stainless steel, vented.
 - j. Port: Full.

2.5 IRON BALL VALVES

A. Class 125, Iron Ball Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Kitz Corporation.
 - d. Sure Flow Equipment Inc.
 - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - f. **<Insert manufacturer's name>**.
2. Description:
 - a. Standard: MSS SP-72.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Split body.
 - d. Body Material: ASTM A 126, gray iron.
 - e. Ends: Flanged.
 - f. Seats: PTFE or TFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel.
 - i. Port: Full.

2.6 IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. 150 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
 - b. Bray Controls; a division of Bray International.
 - c. Conbraco Industries, Inc.; Apollo Valves.
 - d. Cooper Cameron Valves; a division of Cooper Cameron Corp.

- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Milwaukee Valve Company.
- k. NIBCO INC.
- l. Norriseal; a Dover Corporation company.
- m. Red-White Valve Corporation.
- n. Spence Strainers International; a division of CIRCOR International.
- o. Tyco Valves & Controls; a unit of Tyco Flow Control.
- p. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- q. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 150 psig (1035 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Aluminum bronze.

B. 150 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Milwaukee Valve Company.
- k. NIBCO INC.
- l. Norriseal; a Dover Corporation company.
- m. Red-White Valve Corporation.
- n. Spence Strainers International; a division of CIRCOR International.
- o. Tyco Valves & Controls; a unit of Tyco Flow Control.
- p. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- q. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 150 psig (1035 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.

- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Aluminum bronze.

C. 150 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Ductile-Iron Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Center Line.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Milwaukee Valve Company.
- k. Mueller Steam Specialty; a division of SPX Corporation.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Spence Strainers International; a division of CIRCOR International.
- o. Sure Flow Equipment Inc.
- p. Tyco Valves & Controls; a unit of Tyco Flow Control.
- q. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- r. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 150 psig (1035 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Nickel-plated[**or -coated**] ductile iron.

D. 150 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Ductile-Iron Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Center Line.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.

- h. Hammond Valve.
- i. Kitz Corporation.
- j. Milwaukee Valve Company.
- k. Mueller Steam Specialty; a division of SPX Corporation.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Spence Strainers International; a division of CIRCOR International.
- o. Sure Flow Equipment Inc.
- p. Tyco Valves & Controls; a unit of Tyco Flow Control.
- q. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- r. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 150 psig (1035 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Nickel-plated[or -coated] ductile iron.

E. 150 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Stainless-Steel Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Milwaukee Valve Company.
- k. Mueller Steam Specialty; a division of SPX Corporation.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Red-White Valve Corporation.
- o. Spence Strainers International; a division of CIRCOR International.
- p. Sure Flow Equipment Inc.
- q. Tyco Valves & Controls; a unit of Tyco Flow Control.
- r. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- s. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 150 psig (1035 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.

- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

F. 150 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Stainless-Steel Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Milwaukee Valve Company.
- k. Mueller Steam Specialty; a division of SPX Corporation.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Red-White Valve Corporation.
- o. Spence Strainers International; a division of CIRCOR International.
- p. Sure Flow Equipment Inc.
- q. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- r. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 150 psig (1035 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

G. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- d. Crane Co.; Crane Valve Group; Jenkins Valves.
- e. Crane Co.; Crane Valve Group; Stockham Division.
- f. DeZurik Water Controls.
- g. Flo Fab Inc.

- h. Hammond Valve.
- i. Kitz Corporation.
- j. Legend Valve.
- k. Milwaukee Valve Company.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Red-White Valve Corporation.
- o. Spence Strainers International; a division of CIRCOR International.
- p. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- q. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Aluminum bronze.

H. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Aluminum-Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Conbraco Industries, Inc.; Apollo Valves.
- c. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- d. Crane Co.; Crane Valve Group; Jenkins Valves.
- e. Crane Co.; Crane Valve Group; Stockham Division.
- f. DeZurik Water Controls.
- g. Flo Fab Inc.
- h. Hammond Valve.
- i. Kitz Corporation.
- j. Legend Valve.
- k. Milwaukee Valve Company.
- l. NIBCO INC.
- m. Norriseal; a Dover Corporation company.
- n. Red-White Valve Corporation.
- o. Spence Strainers International; a division of CIRCOR International.
- p. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- q. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.

- g. Disc: Aluminum bronze.
- I. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Ductile-Iron Disc:
- 1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
 - b. American Valve, Inc.
 - c. Conbraco Industries, Inc.; Apollo Valves.
 - d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
 - e. Crane Co.; Crane Valve Group; Center Line.
 - f. Crane Co.; Crane Valve Group; Stockham Division.
 - g. DeZurik Water Controls.
 - h. Flo Fab Inc.
 - i. Hammond Valve.
 - j. Kitz Corporation.
 - k. Legend Valve.
 - l. Milwaukee Valve Company.
 - m. Mueller Steam Specialty; a division of SPX Corporation.
 - n. NIBCO INC.
 - o. Norriseal; a Dover Corporation company.
 - p. Spence Strainers International; a division of CIRCOR International.
 - q. Sure Flow Equipment Inc.
 - r. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - s. **<Insert manufacturer's name>**.
 - 2. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
 - d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
 - e. Seat: EPDM.
 - f. Stem: One- or two-piece stainless steel.
 - g. Disc: Nickel-plated**[or -coated]** ductile iron.
- J. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Ductile-Iron Disc:
- 1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
 - b. American Valve, Inc.
 - c. Conbraco Industries, Inc.; Apollo Valves.
 - d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
 - e. Crane Co.; Crane Valve Group; Center Line.
 - f. Crane Co.; Crane Valve Group; Stockham Division.
 - g. DeZurik Water Controls.
 - h. Flo Fab Inc.
 - i. Hammond Valve.

- j. Kitz Corporation.
- k. Legend Valve.
- l. Milwaukee Valve Company.
- m. Mueller Steam Specialty; a division of SPX Corporation.
- n. NIBCO INC.
- o. Norriseal; a Dover Corporation company.
- p. Spence Strainers International; a division of CIRCOR International.
- q. Sure Flow Equipment Inc.
- r. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- s. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Nickel-plated[or -coated] ductile iron.

K. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Stainless-Steel Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. American Valve, Inc.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Flo Fab Inc.
- i. Hammond Valve.
- j. Kitz Corporation.
- k. Legend Valve.
- l. Milwaukee Valve Company.
- m. Mueller Steam Specialty; a division of SPX Corporation.
- n. NIBCO INC.
- o. Norriseal; a Dover Corporation company.
- p. Red-White Valve Corporation.
- q. Spence Strainers International; a division of CIRCOR International.
- r. Sure Flow Equipment Inc.
- s. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- t. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.

- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

L. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Stainless-Steel Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. American Valve, Inc.
- c. Conbraco Industries, Inc.; Apollo Valves.
- d. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- e. Crane Co.; Crane Valve Group; Jenkins Valves.
- f. Crane Co.; Crane Valve Group; Stockham Division.
- g. DeZurik Water Controls.
- h. Flo Fab Inc.
- i. Hammond Valve.
- j. Kitz Corporation.
- k. Legend Valve.
- l. Milwaukee Valve Company.
- m. Mueller Steam Specialty; a division of SPX Corporation.
- n. NIBCO INC.
- o. Norriseal; a Dover Corporation company.
- p. Red-White Valve Corporation.
- q. Spence Strainers International; a division of CIRCOR International.
- r. Sure Flow Equipment Inc.
- s. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- t. **<Insert manufacturer's name>**.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

2.7 IRON, GROOVED-END BUTTERFLY VALVES

A. 175 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. Kennedy Valve; a division of McWane, Inc.
- b. Shurjoint Piping Products.

- c. Tyco Fire Products LP; Grinnell Mechanical Products.
- d. Victaulic Company.
- e. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 175 psig (1200 kPa).
- c. Body Material: Coated, ductile iron.
- d. Stem: Two-piece stainless steel.
- e. Disc: Coated, ductile iron.
- f. Seal: EPDM.

B. 300 CWP, Iron, Grooved-End Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. Anvil International, Inc.
- b. Kennedy Valve; a division of McWane, Inc.
- c. Mueller Steam Specialty; a division of SPX Corporation.
- d. NIBCO INC.
- e. Shurjoint Piping Products.
- f. Tyco Fire Products LP; Grinnell Mechanical Products.
- g. Victaulic Company.
- h. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-67, Type I.
- b. NPS 8 (DN 50) and Smaller CWP Rating: 300 psig (2070 kPa).
- c. NPS 10 (DN 250) and Larger CWP Rating: 200 psig (1380 kPa).
- d. Body Material: Coated, ductile iron.
- e. Stem: Two-piece stainless steel.
- f. Disc: Coated, ductile iron.
- g. Seal: EPDM.

2.8 HIGH-PERFORMANCE BUTTERFLY VALVES

A. Class 150, Single-Flange, High-Performance Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- d. Crane Co.; Crane Valve Group; Flowseal.
- e. Crane Co.; Crane Valve Group; Stockham Division.
- f. DeZurik Water Controls.
- g. Hammond Valve.

- h. Jamesbury; a subsidiary of Metso Automation.
- i. Milwaukee Valve Company.
- j. NIBCO INC.
- k. Process Development & Control, Inc.
- l. Tyco Valves & Controls; a unit of Tyco Flow Control.
- m. Xomox Corporation.
- n. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-68.
- b. CWP Rating: 285 psig (1965 kPa) at 100 deg F (38 deg C).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: Carbon steel, cast iron, ductile iron, or stainless steel.
- e. Seat: Reinforced PTFE or metal.
- f. Stem: Stainless steel; offset from seat plane.
- g. Disc: Carbon steel.
- h. Service: Bidirectional.

B. Class 300, Single-Flange, High-Performance Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. ABZ Valve and Controls; a division of ABZ Manufacturing, Inc.
- b. Bray Controls; a division of Bray International.
- c. Cooper Cameron Valves; a division of Cooper Cameron Corp.
- d. Crane Co.; Crane Valve Group; Flowseal.
- e. Crane Co.; Crane Valve Group; Stockham Division.
- f. DeZurik Water Controls.
- g. Hammond Valve.
- h. Jamesbury; a subsidiary of Metso Automation.
- i. Milwaukee Valve Company.
- j. NIBCO INC.
- k. Process Development & Control, Inc.
- l. Tyco Valves & Controls; a unit of Tyco Flow Control.
- m. Xomox Corporation.
- n. <Insert manufacturer's name>.

2. Description:

- a. Standard: MSS SP-68.
- b. CWP Rating: 720 psig (4965 kPa) at 100 deg F (38 deg C).
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: Carbon steel, cast iron, or ductile iron.
- e. Seat: Reinforced PTFE or metal.
- f. Stem: Stainless steel; offset from seat plane.
- g. Disc: Carbon steel.
- h. Service: Bidirectional.

2.9 BRONZE LIFT CHECK VALVES

- A. Class 125, Lift Check Valves with Bronze Disc:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. **<Insert manufacturer's name>**.
 2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: Bronze.
- B. Class 125, Lift Check Valves with Nonmetallic Disc:
1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**
 - a. Flo Fab Inc.
 - b. Hammond Valve.
 - c. Kitz Corporation.
 - d. Milwaukee Valve Company.
 - e. Mueller Steam Specialty; a division of SPX Corporation.
 - f. NIBCO INC.
 - g. Red-White Valve Corporation.
 - h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - i. **<Insert manufacturer's name>**.
 2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig (1380 kPa).
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: NBR, PTFE, or TFE.

2.10 BRONZE SWING CHECK VALVES

- A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. American Valve, Inc.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Hammond Valve.
- f. Kitz Corporation.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Powell Valves.
- j. Red-White Valve Corporation.
- k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- l. Zy-Tech Global Industries, Inc.
- m. **<Insert manufacturer's name>**.

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Kitz Corporation.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Red-White Valve Corporation.
- i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- j. **<Insert manufacturer's name>**.

2. Description:

- a. Standard: MSS SP-80, Type 4.
- b. CWP Rating: 200 psig (1380 kPa).
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: PTFE or TFE.

C. Class 150, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. American Valve, Inc.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Kitz Corporation.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Red-White Valve Corporation.
- i. Zy-Tech Global Industries, Inc.
- j. **<Insert manufacturer's name>**.

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 300 psig (2070 kPa).
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

D. Class 150, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, **[provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:**

- a. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.
- c. Hammond Valve.
- d. Milwaukee Valve Company.
- e. NIBCO INC.
- f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- g. **<Insert manufacturer's name>**.

2. Description:

- a. Standard: MSS SP-80, Type 4.
- b. CWP Rating: 300 psig (2070 kPa).
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: PTFE or TFE.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. **[Center-Guided]** **[and]** **[Plate-Type]** Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

END OF SECTION 230523

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 hangers and supports for HVAC system piping and equipment:
 - 1. Metal framing systems.
 - 2. Fastener systems.
 - 3. Duct stands.
- B. Related Sections include the following:
 - 1. Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, seismic and wind loading.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel duct hangers and supports.
 - 2. Expansion anchors - concrete.
 - 3. Manufactured rooftop duct and equipment supports
- B. Shop Drawings: Show fabrication and installation details.
 - 1. Metal framing systems. Include Product Data for components.
 - 2. Fabricated duct support frames
- C. Welding certificates.

- D. Seismic and wind calculations by CT PE with signed stamp

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
- B. Galvanized, Metallic Coatings: Hot dipped.
- C. Nonmetallic Coatings: VOC compliant exterior industrial UV-resistant mastic paint for direct application to metal.
- D. Padded Hangers or limit stops: Hanger or stop with rubber pad or cushion for support of bearing or rubbing surface of duct.

2.2 TRAPEZE DUCT HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated duct-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated support assembly made of steel channels, and other components.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 - 3. GS Metals Corp.
 - 4. Power-Strut Div.; Tyco International, Ltd.
 - 5. Thomas & Betts Corporation.
 - 6. Tolco Inc.
 - 7. Unistrut Corp.; Tyco International, Ltd.

- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 FASTENER SYSTEMS

- A. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Empire Industries, Inc.
 - c. Hilti, Inc.
 - d. ITW Ramset/Red Head.
 - e. MKT Fastening, LLC.
 - f. Powers Fasteners.

2.5 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Paint: VOC compliant, ultraviolet-resistant industrial exterior painting system suitable for application over galvanized or lightly rusted steel.
 - 1. Equal to Rust-Oleum Direct-to-Metal Polyester Urethane Mastic
- C. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Use hangers frames and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- B. Use padded limit stops for ductwork that is subject to scratching.

3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment to support equipment above roof.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

- A. Cut, drill, weld and fit miscellaneous metal fabrications for duct hangers and equipment supports.

- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and 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. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of Duct.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting.
 - 1. Apply paint by brush to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metals.
- C. Touch Up: Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.
- D. Galvanized steel exterior ductwork and galvanized components of duct and equipment support systems:
 - 1. Preparation: Clean manufacturing oil, dirt, and dust from surfaces using a water-based detergent system. **DO NOT DO THIS ON THE ROOF.** Do not allow cleaning water to wet insulation between duct walls.
 - 2. Protect cleaned surfaces from re-contamination before and during installation.
 - 3. Paint ductwork before installation where possible, and touch-up afterward. Protect roof from paint dripping. Any painting done on the roof shall be by brush or roller – not spray.

END OF SECTION 230529

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Equipment support bases.
- B. Vibration isolators.
- C. Seismic restraints for suspended components and equipment.

1.2 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2016.
- B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.
- C. FEMA 412 - Installing Seismic Restraints for Mechanical Equipment; 2002.
- D. FEMA 413 - Installing Seismic Restraints for Electrical Equipment; 2004.
- E. FEMA 414 - Installing Seismic Restraints for Duct and Pipe; 2004.
- F. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage; 2012.
- G. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

1.5 QUALITY ASSURANCE

- A. Perform design and installation in accordance with applicable codes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Kinetics Noise Control, Inc: www.kineticsnoise.com.
- B. Mason Industries: www.mason-ind.com.

- C. Vibration Eliminator Company, Inc. www.veco-nyc.com.

2.2 PERFORMANCE REQUIREMENTS

- A. General:
1. All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.
 2. Steel springs to function without undue stress or overloading.

2.3 EQUIPMENT SUPPORT BASES

- A. Structural Bases:
1. Construction: Engineered, structural steel frames with welded brackets for side mounting of the isolators.
 2. Frames: Square, rectangular or T-shaped.
 3. Design: Sufficiently rigid to prevent misalignment or undue stress on machine, and to transmit design loads to isolators and snubbers.

2.4 VIBRATION ISOLATORS

- A. Non-Seismic Type:
1. All Elastomeric-Fiber Glass Pads:
 - a. Configuration: Flat or molded.
 - b. Thickness: 0.25 inch (6 mm) minimum.
 - c. Assembly: Single or multiple layers using bonded, galvanized sheet metal separation plate between each layer with load plate providing evenly distributed load over pad surface.
 2. Elastomeric Mounts:
 - a. Material: Oil, ozone, and oxidant resistant compounds.
 - b. Assembly: Encapsulated load transfer plate bolted to equipment and base plate with anchor hole bolted to supporting structure.
 3. Steel Springs:
 - a. Assembly: Freestanding, laterally stable without housing.
 - b. Leveling Device: Rigidly connected to equipment or frame.
 4. Restrained Steel Springs:
 - a. Housing: Rigid blocking during rigging prevents equipment installed and operating height from changing during temporary weight reduction.
 - b. Equipment Wind Loading: Adequate means for fastening isolator top to equipment and isolator base plate to supporting structure.
 5. Spring Hanger:
 - a. Housing: Steel construction containing stable steel spring and integral elastomeric element preventing metal to metal contact.
 - b. Bottom Opening: Sized to allow plus/minus 15 degrees rod misalignment.
 6. Combination Elastomeric-Spring Hanger:
 - a. Housing: Steel construction containing stable steel spring with elastomeric element in series isolating upper connection of hanger box to building structure.
 - b. Bottom Opening: Sized to allow plus/minus 15 degrees rod misalignment.
 7. Thrust Restraints:
 - a. Housing: Steel construction containing stable steel spring and integral elastomeric element installed in pairs to resist air pressure thrusts.
 - b. Bottom Openings: Sized to allow plus/minus 15 degrees rod misalignment.

2.5 SEISMIC RESTRAINTS FOR SUSPENDED COMPONENTS AND EQUIPMENT

- A. Comply with:
 - 1. ASHRAE (HVACA) Handbook - HVAC Applications.
 - 2. FEMA 412.
 - 3. FEMA 413.
 - 4. FEMA 414.
 - 5. FEMA E-74.

- B. Cable Restraints:
 - 1. Wire Rope: Steel wire strand cables sized to resist seismic loads in all lateral directions.
 - 2. Protective Thimbles: Eliminates potential for dynamic cable wear and strand breakage.
 - 3. Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.
 - 4. Connections:
 - a. Use overlapping wire rope U clips, cable clamping bolts, swaged sleeves or seismically rated tool-less wedge insert lock connectors.
 - b. Internally brace clevis hanger bracket cross bolt to prevent deformation.
 - 5. Vertical Suspension Rods: Attach required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

- C. Rigid Restraints:
 - 1. Structural Element: Sized to resist seismic loads in all lateral directions and carry both compressive and tensile loading.
 - 2. Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.
 - 3. Connections: Internally brace clevis hanger bracket cross bolt to prevent deformation.
 - 4. Static Support System: Anchorage capable of carrying additional tension loads generated by the vertical component of the rigid brace compression which is additive to any static load requirements on the system.
 - 5. Vertical Suspension Rods: Attached required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's instructions.

3.2 INSTALLATION - SEISMIC

- A. Piping:
 - 1. Provide seismic bracing in accordance ASCE 7.
 - 2. Provide supports, braces, and anchors to resist gravity and seismic design forces.
 - 3. Provide flexible connections between floor mounted equipment and suspended piping; between unbraced piping and restrained suspended items; as required for thermal movement; at building separations and seismic joints; and wherever relative differential movements could damage pipe in an earthquake.
 - 4. Brace resiliently supported pipe with cable bracing or alternate means designed to prevent transmission of vibrations and noise to the structure.
 - 5. Brace every run 5.0 feet (1.5 m) or more in length with two transverse and one longitudinal bracing locations.

6. Pipes and Connections Constructed of Ductile Materials (copper, ductile iron, steel or aluminum and brazed, welded or screwed connections):
 - a. Provide transverse bracing at spacing not more than 40.0 feet (12.2 m) on center.
 - b. Provide longitudinal bracing at spacing not more than 80.0 feet (24.4 m) on center.
7. Provide lateral restraint for risers at not more than 30 feet (9.1 m) on center or as required for horizontal runs, whichever is less.
8. Piping Explicitly Exempt from Seismic Bracing Requirements:
 - a. Provide flexible connections between piping and connected equipment, including in-line devices such as VAV boxes and reheat coils.
 - b. Install piping consistent with ASCE 7, such that swinging of the pipes will not cause damaging impact with adjacent components, finishes, or structural framing while maintaining clear horizontal distance of 67 percent of the hanger length between subject components.
 - c. Provide swing restraints as required to control potential impact due to limited space between subject components.
9. Use of proprietary restraint systems with a certificate of compliance, verified and listed by an accredited inspection body is acceptable (pending shop drawing approval), as an alternative to project specific seismic bracing design.

END OF SECTION 230548

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Dampers.
- B. Damper Operators:
 - 1. Electric operators.
- C. Humidistats:
 - 1. Limit duct humidistats.
- D. Input/Output Sensors:
 - 1. Temperature sensors.
 - 2. Humidity sensors.
 - 3. Equipment operation (current) sensors.
 - 4. Damper position indicators.
 - 5. Carbon dioxide sensors.
- E. Thermostats:
 - 1. Electric room thermostats.
 - 2. Room thermostat accessories.
- F. Transmitters:
 - 1. Temperature transmitters.
 - 2. Humidity transmitters.

1.2 RELATED REQUIREMENTS

- A. Section 23 0519 - Meters and Gages for HVAC Piping: Thermometer sockets, gage taps.
- B. Section 23 0923 - Direct-Digital Control System for HVAC.
- C. Section 23 0993 - Sequence of Operations for HVAC Controls.
- D. Section 23 2113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, gage taps.
- E. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.
- F. Section 26 2726 - Wiring Devices: Elevation of exposed components.

1.3 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2012.
- B. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats; 2013.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

1.5 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PART 2 PRODUCTS

2.1 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.2 DAMPERS

- A. Performance: Test in accordance with AMCA 500-D.
- B. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage, 0.1046 inch (2.66 mm).
- C. Blades: Galvanized steel, maximum blade size 8 inches (200 mm) wide, 48 inches (1200 mm) long, minimum 22 gage, 0.0299 inch (0.76 mm), attached to minimum 1/2 inch (13 mm) shafts with set screws.
- D. Blade Seals: Synthetic elastomeric, inflatable, mechanically attached, field replaceable.
- E. Jamb Seals: Spring stainless steel.
- F. Shaft Bearings: Oil impregnated sintered bronze.
- G. Linkage Bearings: Oil impregnated sintered bronze.
- H. Leakage: Less than one percent based on approach velocity of 2000 ft per min (10 m per sec) and 4 inches wg (1.0 kPa).

2.3 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
 - 1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
- B. Electric Operators:
 - 1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.4 HUMIDISTATS

- A. Limit Duct Humidistats:
 - 1. Insertion, two position type.
 - 2. Throttling Range: Adjustable 2 percent relative humidity.
 - 3. Operating Range: 20 to 80 percent.

2.5 INPUT/OUTPUT SENSORS

- A. Temperature Sensors:
 - 1. Performance Characteristics:
 - a. Temperature Transmitter:
 - 1) Accuracy: 0.10 degree F (0.06 degrees C) minimum or plus/minus 0.20 percent of span.
 - 2) Output: 4 to 20 mA.
 - b. Sensing Range:
 - 1) Use temperature transmitters in conjunction with RTD's when RTD's are incompatible with DDC controller direct temperature input.
 - c. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
 - d. Room Temperature Sensors:
 - 1) Provide the following:

- (a) Setpoint reset slide switch with an adjustable temperature range.
 - (b) Individual heating/cooling setpoint slide switches.
 - (c) Momentary override request push button for activation of after-hours operation.
- B. Humidity Sensors:
 - 1. Duct Mounted Sensor: Voltage type encased in a die-cast metal, weather-proof housing.
 - a. Input Power, Voltage Type: Class 2; 12-30 VDC/24 VAC, 15mA max.
 - b. Input Power, mA Type: Class 2; Loop powered 12-30 VDC only, 30 mA max.
 - c. Output Voltage Type: 3-wire observed polarity.
 - d. Output mA Type: 2-wire, not polarity sensitive (clipped and capped).
 - e. Humidity:
 - 1) Accuracy 1 percent at 10 to 80 percent relative humidity at 77 degrees F (25 degrees C), multi-point calibration, NIST traceable.
 - 2) Scaling: 0 to 100 percent RH.
 - f. Operating Environment:
 - 1) Operating Humidity Range: 0 to 100 percent RH noncondensing.
- C. Damper Position Indicators: Potentiometer mounted in enclosure with adjustable crank arm assembly connected to damper to transmit 0 to 100 percent damper travel.
- D. Carbon Dioxide Sensors, Duct:
 - 1. General: Provide non-dispersive infrared (NDIR), diffusion sampling CO2 sensors with integral transducers and linear output.
 - 2. Air Temperature: Range of 32 to 122 degrees F (0 to 50 degrees C).
 - 3. Relative Humidity: Range of 0 to 95 percent (non-condensing).
 - 4. Power Input: Class 2; 12 to 30VDC or 24VAC 50/60 Hz; 100mA max.
 - 5. Calibration Characteristics:
 - a. Automatically compensating algorithm for sensor drift due to sensor degradation.
 - b. Maximum Drift: 2 percent.
 - c. User calibratable with a minimum calibration interval of 5 years.
 - 6. Construction:
 - a. Sensor Chamber: Non-corrosive material for neutral effect on carbon dioxide sample.
 - b. Provide duct mounted sensors with duct probe designed to protect sensing element from dust accumulation and mechanical damage.

2.6 THERMOSTATS

- A. Electric Room Thermostats:
 - 1. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
 - 2. Service: Cooling and heating.
 - 3. Covers: Locking with set point adjustment, with thermometer.
- B. Room Thermostat Accessories:
 - 1. Thermostat Covers: Brushed aluminum.

PART 3 - PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches and humidistats. Refer to Section 26 2726.
- C. Mount freeze protection thermostats using flanges and element holders.
- D. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.
- E. Provide guards on thermostats in entrances.
- F. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors.
- G. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- H. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- I. Provide conduit and electrical wiring in accordance with Section 26 0583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION 230593

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Provide insulation for the following systems:
 - 1. Heating hot water supply and return piping.
 - 2. Ductwork.
 - 3. Condensate Drain Piping.

1.2 SUBMITTALS

- A. Product data and installation instructions on all materials shall be submitted to Engineer for approval. The Contractor shall indicate in his submittal material thickness, where each material shall be used, and method of application.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store insulation with factory shipping packaging in a dry location protected from the outdoor elements including extreme heat and cold.
- B. Protect insulation from damage during transit, delivery, storage and during entire construction period.
- C. Installing contractor is responsible for any and all damage to insulation.
- D. Do not deliver insulating materials until interior building work is suitably complete and ready to accept the materials without compromising any storage or protection requirements of this specification and the manufacturers warrantee.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Fiberglass Insulation
 - 1. Manville/Schuller
 - 2. CertainTeed/Manson
 - 3. Owens/Corning
 - 4. Knauf
- B. Flexible Foam Insulation
 - 1. Armstrong
 - 2. Halstead

2.2 MATERIALS

A. Pipe Insulation

1. Equal to Manville "Micro-Lok AP" molded all-purpose fiberglass pipe insulation.
2. Insulation thickness shall be:

<u>Type</u>	<u>Pipe Size</u>	<u>Thickness</u>
Heating hot water	<= 1.5"	1-1/2"
	> 1.5"	2"

Condensate Piping	1/2" – 4"	1/2"
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- a. Interior insulation jacket shall be equal to Manville ASJ.
- b. Provide weatherproof aluminum jacket for all exterior piping exposed to the elements.

B. Valve and Fitting Insulation

1. Equal to Manville molded fiberglass insulation with Zeston 2000 series 25/50 Class A covers.

C. Tank and Heat Exchanger Insulation

1. Equal to Manville Pipe and Tank insulation, (flexible board type insulation) 2" thick, with all purpose jacket. The fiber orientation of the insulation shall be perpendicular to the board surface.

D. Duct Insulation: Insulate ductwork in conditioned spaces with R=5 duct insulation with aluminum foil scrim Kraft facing. Insulate ductwork in unheated and/or unconditioned spaces with 2 inch duct insulation with aluminum foil scrim Kraft facing. Density shall be 1.5 lb/cu. ft. equal to Knaufl "Duct Wrap FSK".

E. All insulation and covering systems shall have Fire Hazard Classification not exceeding 25 Flame Spread, 50 Fuel Contribution, and 50 Smoke Developed when tested under ASTM E84 and UL723.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Pipe, Valve, and Fitting Insulation

1. Install all insulation according to manufacturer's instructions. All butt joints are to be tight and sealed with ASJ butt laps. Secure longitudinal seams with outward clinch staples or a suitable lap adhesive. Provide stenciled pipe labels and flow direction arrows on all insulated piping.
2. Fasten throats of fitting covers with stainless steel serrated tacks. Use of steel staples to fasten covers is not acceptable. Seal seams and all overlaps of fitting covers to insulation jacket with PVC tape. Seal all exposed fiberglass with lagging mastic, including pipe hanger gaps, ends and valve protrusions.

3. Completed work shall be smooth and straight. Fitting covers shall fit tight to pipe insulation with no gaps or fishmouths in throat seams or joints. Completed insulation work judged aesthetically unacceptable by the Engineer shall be corrected by the contractor at no cost to Owner.
4. Provide saddles to protect insulation at all pipe hangers. Do not penetrate insulation vapor barrier at hangers.
5. Do not insulate plastic air conditioning condensate piping.

B. Duct Insulation

1. Install duct insulation after ductwork has been inspected and approved.
2. Install according to manufacturer's instructions.
3. Seal jacket butt joints with FSK tape.
4. Duct to be insulated:
 - a. Insulate all outside air and unlined supply ductwork.
 - b. Insulate all return ducts in unconditioned spaces.
 - c. Insulate all exhaust ducts in unheated spaces.
 - d. Consider the space above suspended acoustical ceilings but below roof/ceiling insulation conditioned space. Truss spaces above building insulation are unconditioned and unheated.

END OF SECTION 230700

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following HVAC equipment that is not factory insulated:
 - 1. Heating, hot-water pumps.
 - 2. Expansion/compression tanks.
 - 3. Air separators.
- B. Related Sections:
 - 1. Section 230713 "Duct Insulation."
 - 2. Section 230719 "HVAC Piping Insulation."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

- B. Coordinate clearance requirements with equipment Installer for equipment insulation application.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- D. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- E. Calcium Silicate:
 - 1. Flat-, curved-, and grooved-block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Block Insulation: ASTM C 552, Type I.
 - 2. Special-Shaped Insulation: ASTM C 552, Type III.
 - 3. Board Insulation: ASTM C 552, Type IV.
 - 4. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
- H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, [Type I] [Type II with factory-applied vinyl jacket] [Type III with factory-applied FSK jacket] [Type III with factory-applied FSP jacket]. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- I. Phenolic:
 - 1. Block insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type II, Grade 1.

2. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
 3. Factory-Applied Jacket: [None] [ASJ]. Requirements are specified in "Factory-Applied Jackets" Article.
- J. Polyisocyanurate: Unfaced, preformed, rigid cellular polyisocyanurate material intended for use as thermal insulation.
1. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F (0.027 W/m x K) at 75 deg F (24 deg C) after 180 days of aging.
 2. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1 inch (25 mm) as tested by ASTM E 84.
 3. Fabricate shapes according to ASTM C 450 and ASTM C 585.
 4. Factory-Applied Jacket: Requirements are specified in "Factory-Applied Jackets" Article.
 - a. Equipment Applications: [None] [ASJ] [ASJ-SSL] [PVDC] [PVDC-SSL].
- K. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Calcium Silicate Adhesive: Fibrous, sodium-silicate-based adhesive with a service temperature range of 50 to 800 deg F (10 to 427 deg C).
1. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F (minus 73 to plus 93 deg C).
1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Phenolic and Polyisocyanurate Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F (minus 59 to plus 149 deg C).
1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- E. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- F. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- G. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
 - 1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over equipment insulation.
 - 2. Service Temperature Range: 0 to plus 180 deg F (Minus 18 to plus 82 deg C).
 - 3. Color: White.

2.4 SEALANTS

- A. Joint Sealants:
 - 1. Materials shall be compatible with insulation materials, jackets, and substrates.
 - 2. Permanently flexible, elastomeric sealant.
 - 3. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
 - 4. Color: White or gray.
 - 5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- B. FSK and Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
4. Color: Aluminum.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
4. Color: White.
5. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
6. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. PVDC Jacket for Indoor Applications: 4-mil- (0.10-mm-) thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perm (0.013 metric perm) when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.
6. PVDC Jacket for Outdoor Applications: 6-mil- (0.15-mm-) thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perm (0.007 metric perm) when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.
7. PVDC-SSL Jacket: PVDC jacket with a self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
8. Vinyl Jacket: White vinyl with a permeance of 1.3 perms (0.86 metric perm) when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.6 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Adhesive: As recommended by jacket material manufacturer.
 - 2. Color: White.
 - 3. Factory-fabricated tank heads and tank side panels.
- D. Metal Jacket:
 - 1. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
 - 2. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.
 - a. Sheet and roll stock ready for shop or field sizing
 - b. Material, finish, and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - d. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.

- 7) Valve covers.
- 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.7 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 - 1. Width: 3 inches (75 mm).
 - 2. Thickness: 11.5 mils (0.29 mm).
 - 3. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
 - 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
 - 1. Width: 3 inches (75 mm).
 - 2. Thickness: 6.5 mils (0.16 mm).
 - 3. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
 - 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 - 1. Width: 2 inches (50 mm).
 - 2. Thickness: 6 mils (0.15 mm).
 - 3. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
 - 4. Elongation: 500 percent.
 - 5. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
 - 1. Width: 2 inches (50 mm).
 - 2. Thickness: 3.7 mils (0.093 mm).
 - 3. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
 - 4. Elongation: 5 percent.
 - 5. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

2.8 SECUREMENTS

- A. Bands:
 - 1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or type 316; 0.015 inch thick, 3/4 inch (19 mm)] wide with closed seal.
 - 2. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with closed seal.

3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- (3.5-mm-) diameter shank, length to suit depth of insulation indicated.
2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- (3.5-mm-) diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.
3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place.
 - a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
 - b. Spindle: Stainless steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place.
 - a. Baseplate: Perforated, nylon sheet, 0.030 inch (0.76 mm) thick by 1-1/2 inches (38 mm) in diameter.
 - b. Spindle: Nylon, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches (63 mm).
 - c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place.
 - a. Baseplate: Galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
 - b. Spindle: Stainless steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
 - c. Adhesive-backed base with a peel-off protective cover.
6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
 - a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

- 7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.
- D. Wire: 0.062-inch (1.6-mm) soft-annealed, stainless steel

2.9 CORNER ANGLES

- A. PVC Corner Angles: 30 mils (0.8 mm) thick, minimum 1 by 1 inch (25 by 25 mm), PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inch (0.61 mm) thick, minimum 1 by 1 inch (25 by 25 mm), stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils (0.127 mm) thick and an epoxy finish 5 mils (0.127 mm) thick if operating in a temperature range between 140 and 300 deg F (60 and 149 deg C). Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F (0 and 149 deg C) with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- O. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Manholes.
 5. Handholes.
 6. Cleanouts.

3.4 INSTALLATION OF EQUIPMENT INSULATION

- A. Insulation Installation on Pumps:
1. Fabricate metal boxes lined with insulation. Fit boxes around pumps and coincide box joints with splits in pump casings. Fabricate joints with outward bolted flanges. Bolt flanges on 6-inch (150-mm) centers, starting at corners. Install 3/8-inch- (10-mm-) diameter fasteners with wing nuts. Alternatively, secure the box sections together using a latching mechanism.
 2. Fabricate boxes from stainless steel, at least 0.050 inch (1.3 mm) thick.
 3. For below ambient services, install a vapor barrier at seams, joints, and penetrations. Seal between flanges with replaceable gasket material to form a vapor barrier.

3.5 INSTALLATION OF PHENOLIC INSULATION

- A. Secure single-layer insulation with stainless-steel bands at 12-inch (300-mm) intervals and tighten bands without deforming insulation materials.
- B. Install two-layer insulation with joints tightly butted and staggered at least 3 inches (75 mm). Secure inner layer with 0.062-inch (1.6-mm) wire spaced at 12-inch (300-mm) intervals. Secure outer layer with stainless-steel bands at 12-inch (300-mm) intervals.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 - 1. Draw jacket smooth and tight to surface with 2-inch (50-mm) overlap at seams and joints.
 - 2. Embed glass cloth between two 0.062-inch- (1.6-mm-) thick coats of lagging adhesive.
 - 3. Completely encapsulate insulation with coating, leaving no exposed insulation.

- B. Where FSK jackets are indicated, install as follows:
 - 1. Draw jacket material smooth and tight.
 - 2. Install lap or joint strips with same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

- C. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

- D. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.7 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

- B. Do not field paint aluminum or stainless-steel jackets.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

- B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

END OF SECTION 230716

PART 1 - GENERAL

WORK INCLUDED

A. Contacts

An Automated Logic system was installed at the Bridgeport facility in 1990 and is serviced through ALC Controls in Wallingford, CT. Joe Furman of ALC Controls may be contacted at 203-284-0100. Email: joe.furman@automatedlogic.com.

B. Existing System

The existing HVAC control system at the Greater Bridgeport Mental Health Center is a combination of pneumatic and computerized electronic devices. The HVAC controls in the building were originally entirely pneumatic. In the 1990's an Automated Logic DDC system was installed. This system has direct control of most air-handling unit functions, with air dampers having electric actuation. The DDC system exercises permissive control over the perimeter radiation (via existing SCR controllers on each floor) and over the room reheat coils (via control air pressure to pneumatic room thermostats). In 2006, there was a renovation to the seventh floor, which established direct control over the room reheat coils on this floor. There are approximately 343 existing DDC points in the system.

C. Pneumatic Control

1. Existing pneumatic room thermostats control electric reheat coils. Blow out pneumatic lines, clean and calibrate existing components to remain on non-patient floors (i. e. ground, 1st, 2nd, 3rd, and 4th floors).
2. Refurbish pneumatic air supply pressure controls to provide 15 psig pressure in the occupied cycle and 20 psig in the unoccupied cycle to all existing pneumatic thermostats on non-patient floors and other devices. Provide new regulators and DDC switching valves and other required components for an as-new control air supply. Existing control air compressor(s) shall be serviced and reused.

D. Installation of new control components and controlled devices including dampers, valves and actuators.

E. Installation of additional sensing and control points necessary to execute the functions described in the Sequence of Operations section.

F. Incorporating existing DDC points into new system.

G. Installation of all control wiring (regardless of voltage) necessary to support the DDC controls scope of work.

H. Connection to building LAN and State of CT for purposes of local and remote WEB access.

I. Control equipment and devices, interconnecting wire and cable, sensors and input/output devices.

J. New operator's workstation with new PC, web-based network controller, and operating software (operating system and web browser)

- K. DDC system Software (Including all required customization for this project).
- L. Training (Both hardware & software)
- M. One year monitoring, maintenance and service contract
- N. Participation in Commissioning of new controls & HVAC equipment.
- O. Participation with air balance contactor and mechanical contractor.

RELATED SECTIONS

- P. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 and all division 23 & 26 Specification Sections, apply to this Section.
- Q. Section 23 09 01 Sequence of Operations

REFERENCES

- R. ASHRAE 85 - Automatic Control Terminology for Heating, Ventilating, Air Conditioning.
- S. ASHRAE 135-95 BACnet Communication Standard
- T. NEMA EMC1 - Energy Management Systems Definitions.

DEFINITIONS

- U. Ensure terminology used in submittals conforms to ASHRAE 85, or NEMA EMC1. Clearly indicate standards used for submittals.

SYSTEM DESCRIPTION

- V. General
 - 1. Provide a BacNet, Lon or combination of the two Distributed Processing System complete with Direct Digital Control (DDC) and Direct Analog Control (DAC) software. This system is to control all specified equipment as described in the Sequence of Operations section.
 - 2. This system shall include all points on the existing DDC system whether or not mentioned in the Sequence of Operations section.
- W. All DDC Controllers furnished by this section for equipment shall be of the same manufacturer.
- X. Provide all necessary gateways and other material and labor necessary for successful communication between the DDC and intelligent on-board controls provided by equipment manufacturers. Successfully resolve all communication issues involving communication between LON and BacNet devices or portions of DDC network utilizing both protocols.

Y. Basic System Features

1. Zone by zone control of space temperature, usage scheduling, optimum starting, equipment alarm and failure reporting, and override timers for off-hours usage. A zone is an area serviced by one HVAC unit, or a group of spaces with a common use pattern as defined by the Owner.
2. Complete energy management software to include fully licensed copies with all applicable upgrades. Provide copies for Engineer's office, and Owner's workstation and laptop computer.
3. Priority password security systems to prevent unauthorized use.
4. User audit log for tracking operator entries and changes to any information on the system.
5. Equipment monitoring and alarm function including information for diagnosing equipment problems.
6. Auto-restart on power failure. Battery backed-up memory storing software, setpoints and for recording changes in schedules.
7. Modular system design of proven reliability utilizing Personal Computer technology.
8. Each field panel capable of independent control of its area in case of CPU failure.
9. All software and interface equipment including modems for connection to remote monitoring station.
10. Operator may select individual security levels to modify displays, menus and menu format headings, data base information, etc., at will, with no required auxiliary equipment.
11. Operator may select individual security level assignments for each operation and menu selection available according to his/her specific operational responsibilities.
12. Graphics. A standard graphics package shall allow operator capability of constructing floor plan drawings, mechanical equipment piping diagrams, mechanical symbol drawings at will, while system is on line. Graphics to be dynamic, displaying current point data information. All graphics and programming shall be generated by local controls supplier independent of any factory personnel or support. Owner shall provide floor plans on disk in AutoCAD format for installer's use in preparing shop drawings and as input to dynamic temperature, status, alarm and setpoint displays on portable and fixed work stations.
13. Field control devices such as DDC terminal unitary controllers shall be optically isolated. Controllers not optically isolated and utilizing a ground referenced communication technique are specifically prohibited.
14. Communication wiring for field control devices shall not be dependent on daisy chaining of communication wiring. Communication wire may be run in star patterns, daisy chained or combination of either allowing units to be added to a communication line easily in the future.
15. System shall utilize BACnet, and/or LON communication protocols. All intelligent equipment shall be native to one of those protocols. Provide gateways where required to allow communication over the DDC network. At the highest level, DDC network shall communicate over building ethernet network. All DDC displays shall be configured as web pages and shall be made available to the Owner over the building, network and to the State of CT. The DDC contractor shall have ultimate responsibility for successful communications with all equipment and shall provide all hardware and software necessary for communication with and retrieval of control point data from all equipment with manufacturer-provided control systems, regardless of control protocol supported by those control systems.

- Z. Provide all control points shown by drawings, all existing points, and all control points required to implement Sequence of Operations - Section 230901.

BASIC OPERATING FEATURES

AA. Binary Capabilities

1. Monitor binary sensors, continuously storing present contact condition in memory.
2. Indicate if point is Off-normal, in alarm, or off-line.
3. Program output points for Open/Closed, Test/Reset, Start/Stop.
4. Feedback Start/Stop points. Employ point unique, feedback delay timer to temporarily suppress alarm reporting after input to allow time for response.
5. Output advisory message if response is not as commanded.
6. Hold points in present operating condition if controls power failure occurs.

BB. Analog Capabilities

1. Measure, transduce, transmit and display analog values.
2. Express analog point values in proper engineering units, displaying with up to seven significant digits.
3. Have sensor to readout accuracy of plus or minus 0.5 degrees F.
4. Use English system of measurement.
5. Provide for operator designated ranges either linear, series of linear approximations, split ranges, or square root extractions of exponential functions.
6. Compare analog read to high and low limits and annunciate Alarm of Off-Normal condition.
7. Output alarm, including point identification current value and associated engineering units, high or low value, and time and date.
8. Automatically disable alarm reporting upon associated system shutdown. Allow sufficient time to return to normal operating conditions before allowing alarm reporting.
9. Provide limit and differential summary.

CC. Analog Point Adjust

1. Remotely adjust dampers, and valve positions. Automatically adjust points based upon preselected time or value. Use P.I.D. logic.
2. Employ feedback so that if point fails to respond, responds with wrong value, or drifts from point set value by plus or minus 2 percent, output alarm message. Employ feedback delay timer to temporarily suppress alarm reporting after input to allow time for response.
3. Hold points in present operating condition if controls power failure occurs.

SUBMITTALS

DD. Shop Drawings

1. Trunk cable schematic showing all DDC control unit locations, and trunk conductors. Include existing and new work.
2. Control diagrams for each unique equipment control sequence, with associated points list and bill of materials. List contractor's version of sequence of operations on same page as control diagram and points list.
3. List of connected data points, including DDC control units, output and input devices.
4. System graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Include existing and new work.
5. System configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.

6. Descriptive data and sequence of operation of operating, user, and application software.
 7. Elevation drawings of control panels showing component definition and placement within panels and on covers.
 8. Point to point wiring diagrams within panels, including power supplies and between panels and all sensors and actuators. Include existing and new work.
- EE. Product Data: Provide data for each system component and software module, as well as controlled devices, including valves, dampers, and actuators.
- FF. Manufacturer's Installation Instructions: Include for all manufactured components.
- GG. System and controller programming manuals providing sufficient detail to allow changes in sequence of operations to be made by knowledgeable 3rd parties employed by independent control companies.

PROJECT RECORD DOCUMENTS

- HH. Submit 4 copies.
- II. Accurately record actual location of control components, including panels, thermostats, and sensors, cable, etc.
- JJ. Revise shop drawings to reflect actual installation and operating sequences in as much detail as approved submittals.
- KK. Include data specified in "Submittals" in final "Record Documents" form.

OPERATION AND MAINTENANCE DATA

- LL. Include interconnection point-to-point wiring diagrams of complete field installed system with identified and numbered system components, devices, and wire labels.
- MM. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
- NN. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

QUALIFICATIONS

- OO. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified electricians and mechanics qualified for this work and in the regular employ of the temperature system installer. Control contractor shall be responsible for installation. Supervision, calibration, and check out of the system shall be by the employees of the local factory authorized temperature control contracting field office.

WARRANTY

- PP. Provide warranty under provisions of Division 1.

MAINTENANCE SERVICE

- QQ. Furnish on-site service and maintenance of energy management system including parts, labor and software for 18 months starting at the date of substantial completion. Submit service contract for approval by owner and engineer.
1. Ensure all input and output points continue to function properly over the period.
 2. Check calibration on site of all sensors from sensor location through display at the end of one year of operation and again at two years.
 3. Respond to and repair failure or trouble on critical systems within 4 hours. This would include anything which could potentially cause significant occupant discomfort, property loss such as pipe freezing, or damage to equipment, or cause school not to open or close early.
Failure to respond within time shall be grounds for Owner to engage another firm with costs paid by Contractor.
 4. Provide 1-800 or toll free access for tech support.
 5. Provide re-write installation, and commissioning of all software deemed by the Engineer to contain bugs. Repeat this process until Engineer and Owner are satisfied.
 6. Provide licensed copy of all DDC software with periodic updates as required for Engineer to log onto system from his Manchester office. License may expire at end of 2 year period. Provide all access codes and passwords. Engineer agrees not to tamper with codes or schedules without Contractor's or Owner's permission.
- RR. Provide complete service of energy management systems, including call backs. Make minimum of two complete normal inspections of approximately 4 hours duration in addition to normal service calls to inspect, debug and modify software to include changes required for proper operation, and submit written reports.

PART 2 - PRODUCTS

MANUFACTURERS - DIRECT DIGITAL CONTROL SYSTEMS

- A. Available Manufacturers: Manufacturers offering products that may be incorporated into the Work include manufacturers specified.
1. Automated Logic
 2. Allerton
 3. Johnson Controls

BASIC SYSTEM

- B. General
1. The Energy Management and Control System (EMCS) shall be fully integrated and installed as a complete package of controls and instrumentation. The system shall include all computer software and hardware, operator input/output devices, sensors and controls required for complete operation. The controls contractor shall provide all controls wiring, installation, supervision and labor, including calibration, adjustments, operator training and check-out necessary for a complete and fully operating system. Locate system CPU's as directed by owner. Provide for Owner access of DDC displays using

TCP/IP protocol. Provide for access security. Coordinate with state agencies IT staff to establish WEB access to EMCS over agency LAN networks.

C. System Structure

1. The system shall be a complete, stand-alone energy management system consisting of a Central Processing Unit (CPU) which utilizes state-of-the-art technology, simple user-friendly operation, high reliability and modular construction.
2. The basic elements of the EMCS structure shall be built up of only standard components kept in inventory by EMCS supplier. The components shall not require customizing other than setting jumpers and switches, adding firmware modules or software modules or software programming to perform required functions.
3. The system shall be a true distributed processing system. All software control functions to be performed by the intelligent field (DDC) panels. Control software to be in nonvolatile memory. The DDC's shall communicate with the CPU's and Terminal Unit Controllers (TCU's.)

D. Operator's Workstation

1. The location of the EMS operator's workstation shall be coordinated with the owner. A proposed location is shown or indicated on the drawings.
2. The contractor shall provide one desktop personal computer equal to Dell or Hewlett Packard for use as the EMS operator's workstation. The EMS workstation shall come complete with ANSI keyboard, optical mouse, color printer, flat widescreen monitor, power surge protector/suppressor (with 6' cord), Windows 7 professional operating system and shall meet or exceed the following:
 - a. Processor: Intel® Core™ 2 Duo Processor E6700 (4MB L2 Cache,2.66GHz,1066)
 - b. Operating System: Genuine Windows 7 pro
 - c. Software: Microsoft Works (Include MS Word)
 - d. Video Card: 1 DVI, VGA and 1 S-Video (with add-in PCI-Express video card)
 - e. Memory: 2GB³ Dual Channel⁴ DDR2 SDRAM at 667MHz - 2 DIMMs (minimum)
 - f. Hard Drive: 500GB Hard Drive
 - g. Monitor: 21 inch SE198WFP Widescreen Flat Panel Monitor
 - h. CD Drive: (Single Drive) 16X CD burner
 - i. Warranty and Service: 1Yr Service, Parts + Labor, 24x7 Phone Support
 - j. Optional IEEE 1394 - 1 front-panel 6-pin serial connector
 - k. USB: 9 Ports (2 Front, 6 Back, 1 internal)
 - l. Network: Integrated Gigabit¹³ Ethernet
 - m. Integrated 10/100/1000 network interface
 - n. Basic manageability support: WoL, PXE, 10x10mm BGA, Pin compatible with 82566DM
 - o. Legacy: PS/2: two 6-pin mini-DIN (with optional PS2/Serial card) Serial: 1 (with optional PS2/Serial card)
 - p. Expansion Slots: PCI: 3 Slots, PCIe x1: 1 Slot, PCIe x16 (Graphics): 1 Slots, PCIe x4/x8: 1 Slot
 - q. Chassis: 375 Watt DC Power Supply (120V, 60Hz Input) with Backup battery: 3-V CR2032 lithium coin cell

SOFTWARE

E. Web Server Operator Interface

1. Description: Operator Interface Via Web Browser

The control system shall be as shown and consist of a high-speed, peer-to-peer network of DDC controllers and a stand alone web server operator interface. Depict each mechanical system and building floor plan by a point-and-click graphic. A web server shall gather data from this system and generate web pages accessible through a conventional web browser on each PC connected to the network. Operators shall be able to perform all normal operator functions through the web browser interface. Operators with sufficient access level shall have an ability to make changes to all system and equipment graphics in the web server in addition to having full DDC system access to make configuration changes to the control system. Any tools required for making graphic changes shall be provided with web server.

2. Operator Interface

- a. Furnish one Web server interface to be located as directed by building operator. Operators shall be able to access all necessary operational information in the DDC system via client computer utilizing IE web browser. Client computer and IE web browsing software shall not be furnished under this section.
- b. Web server shall connect via the LAN and be able to simultaneously serve up controller information to multiple operators connected via LAN with IE web browsers. Each client web browser connected to server shall be able to access all system information.
- c. Web server shall be compatible with Wireless Access Protocol (WAP) enabled cellular telephone or personal digital assistant (PDA). The PDA/WAP interface may be text-based and shall provide a summary of the most important data.
- d. With the use of a remote SMTP email server the operators interface web server shall be able to notify personnel of an alarm or record information about an alarm in the DDC system.

3. Web Server Hardware:

Furnish one compact web server with Ethernet port for LAN or direct operator client computer access. The web server shall be capable of communicating to the peer to peer DDC controller network. Any required installation or commissioning software shall be pre-installed on the web server. Installation or commissioning of the web server shall be done through a client computer with a standard web browser.

4. Web Browser Interaction

- a. The web server shall be capable of providing the operator, at a client web browser, with both tabular and graphical pages of all controller data. An operator with the proper password level shall be able to change setpoint and occupancy schedules or override points and remove overrides. Dynamic objects shall include analog and binary values, dynamic text, static text, and animation files. Graphics shall have the ability to show animation based on the status of the object, and allow point-and-click user interaction to make changes to the object.
- b. Custom Graphics: The user shall have an ability to customize web server graphics. Custom graphics may be created with the use of graphics generation software. Any graphics generation software required to make these changes shall be provided with the web server.

- c. Graphics Library: Furnish a library of standard HVAC equipment graphics such as chillers, boilers, air handlers, terminals, fan coils, and unit ventilators. The library shall be furnished in a file format compatible with the graphics generation software program. Upon connection to the controls system the web server shall have the capability to learn the controls system and automatically present default web pages with graphics for each controller found.
- d. Alarms. An operator shall be able to access a tabular listing of the system's most recent alarm messages from a standard web browser. This listing shall allow the operator to manage the alarms and acknowledge, print, delete and hyperlink to trouble areas.
- e. Display Information. An operator shall have the capability to perform setup of the web server from a standard web browser. Setup shall include learning new controllers that are added to the controls system, and being able to fully configure the new controller.

5. Performance Standards

System shall conform to the following minimum standards over network connections.

- a. Graphic Display. A graphic with 20 dynamic points shall display with current data within 10 sec.
- b. Graphic Refresh. A graphic with 20 dynamic points shall automatically refresh every 10 sec.
- c. Configuration and Tuning Screens. Screens used for configuring, calibrating, or tuning points, PID loops, and similar control logic shall automatically refresh within 10 sec.
- d. Object Command. Devices shall react to command of a binary object within 2 sec. Devices shall begin reacting to command of an analog object within 2 sec.
- e. Alarm Response Time. An object that goes into alarm shall be annunciated at the web browser within 15 sec.

6. Operator Functions

Operator interface shall allow each authorized operator to execute the following functions as a minimum:

- a. Log In and Log Out. System shall require user name and password to log in to operator interface.
- b. Point-and-click Navigation. Operator interface shall be graphically based and shall allow operators to access entire DDC system using a graphical point-and-click navigation.
- c. View and Adjust Equipment Properties. Operators shall be able to view controlled equipment status and to adjust operating parameters such as setpoints, PID gains, on and off controls, and sensor calibration.
- d. View and Adjust Operating Schedules. Operators shall be able to view scheduled operating hours of each schedulable piece of equipment on a weekly or monthly

calendar-based graphical schedule display, to select and adjust each schedule and time period, and to simultaneously schedule related equipment. System shall clearly show exception schedules and holidays on the schedule display.

- e. View and Respond to Alarms. Operators shall be able to view a list of currently active system alarms, to acknowledge each alarm, and to clear (delete) unneeded alarms. Remote users shall be able to receive alarms via emails or cell phone text messages.
- f. View and Configure Trends. Operators shall be able to view a trend graph of each trended point and to edit graph configuration to display a specific time period or data range. Operator shall be able to create custom trend graphs to display on the same page data from multiple trended points.
- g. View and Configure Reports. Operators shall be able to run preconfigured reports, to view report results, and to customize report configuration to show data of interest.
- h. Manage Control System Hardware. Operators shall be able to view controller status and download new control modifications to each controller.
- i. Manage Operator Access. Typically, only a few operators are authorized to manage operator access. Authorized operators shall be able to view a list of operators with system access and of functions they can perform while logged in. Operators shall be able to add operators, to delete operators, and to edit operator function authorization. Administrators of the system shall be able to authorize each operator function separately.

7. System Software

- a. Operating System and required software. Web server operator interface shall be a self contained web server without the need for any type of maintenance. Any required operating system or software shall be factory loaded and maintenance free.
- b. System Graphics. Operator interface shall be graphical and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using dynamic colors to represent zone temperature relative to zone setpoint.
 - 1) Functionality. Graphics shall depict equipment in an accurate schematic representation to allow operator to monitor system status, to dynamically view a summary of all data for each controlled zone or piece of equipment, to use point-and-click navigation between zones or equipment, and to edit setpoints and other specified parameters.
 - 2) Animation. Graphics shall be able to animate by displaying different image files for changed object status.
 - 3) Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.
 - 4) Format. Graphics shall be saved in an industry-standard format such as JPEG, or GIF. Web-based system graphics shall be viewable on browsers

compatible with World Wide Web Consortium browser standards. Web graphic format shall require no plug-in (such as HTML and JavaScript) or shall only require widely available no-cost plug-ins (such as Active-X and Macromedia Flash).

8. System Tools

System shall provide the following functionality to authorized operators as an integral part of the operator interface or as stand-alone software programs. If furnished as part of the interface, the tool shall be available from each workstation or web browser interface. If furnished as a stand-alone program, software shall be installable on standard Windows compatible PCs with no limit on the number of copies that can be installed under the system license.

- a. Automatic System Database Configuration. Each web server shall store on its hard disk a copy of the current system database. Stored database shall be easily updated with each system configuration or controller firmware or software change.
- b. Controller Configuration. Operators shall be able to modify configuration for each controller in the system.
- c. System Configuration. Operators shall be able to configure the system.
- d. Online Help. Context-sensitive online help for each tool shall assist operators in operating and editing the system.
- e. Security. System shall require a user name and password to view, edit, add, or delete data.
 - 1) Operator Access. Each user name and password combination shall define accessible viewing, editing, adding, and deleting functions in each system application, editor, and object.
 - 2) Automatic Log Out. Automatically log out each operator if no keyboard or mouse activity is detected. Operators shall be able to adjust automatic log out delay.
 - 3) Encrypted Security Data. Store system security data including operator passwords in an encrypted format. System shall not display operator passwords.
- f. System Diagnostics. System shall automatically monitor controller and I/O point operation. System shall annunciate controller failure and I/O point locking (manual overriding to a fixed value).
- g. Alarm Processing. System input and status objects shall be configurable to alarm on departing from and on returning to normal state. Operator shall be able to enable or disable each alarm and to configure alarm limits, alarm limit differentials, alarm states, and alarm reactions for each system object. Configure and enable alarm points as specified in Points List.
- h. Alarm Messages. Alarm messages shall use an English language descriptor without acronyms or mnemonics to describe alarm source, location, and nature.
- i. Alarm Reactions. Operator shall be able to configure (by object) actions that the workstation or web server shall initiate on receipt of each alarm. As a minimum,

workstation or web server shall be able to log, print, display messages, send e-mail, send page, and audibly annunciate.

- j. Alarm Maintenance. Operators shall be able to view system alarms and changes of state chronologically, to acknowledge and delete alarms, and to archive closed alarms to the workstation or web server hard disk from each workstation or web browser interface.
- k. Trend Configuration. Operator shall be able to configure trend sample interval, start time, and stop time for each system data object and shall be able to retrieve data for use in spreadsheets and standard database programs. Operator may alternately choose to sample trends on COV change of value, instead of at a fixed interval. Controller shall sample and store trend data and shall be able to archive data to the hard disk. As a default, trend all input and output points.
- l. Trend data shall be presentable in list or time graph format as operator chooses. Data shall be easily exportable to MS Excel spreadsheet without need to manipulate. Multiple point trend logs shall be easily configured and subsequently used without having to re-configure. Trend data shall not persist for at least 30 days before it starts to be overwritten by new data.
- m. Object and Property Status and Control. Operator shall be able to view, and to edit if applicable, the status of each system object and property by menu or on graphics.
- n. Reports and Logs. Operator shall be able to select, to modify, to create, and to print reports and logs. Operator shall be able to store report data in a format accessible by standard spreadsheet and word processing programs.
- o. Standard Reports. Furnish the following standard system reports:
 - 1) Reports shall be filtered based upon the selected equipment.
 - 2) Alarm Reports
 - 3) Alarm Summary - Current alarms
 - 4) Alarm Sources – List of equipment and associated alarm conditions
 - 5) Alarm Actions – Configured alarm actions such as e-mail and alarm pop-up
 - 6) Schedule Reports
 - 7) Effective Schedules – Displays effective schedules for each equipment
 - 8) Schedule Instances – Displays all schedules entered
 - 9) Security Reports – Maintains audit of all actions taken through user interface
 - 10) Commissioning Reports – Provide equipment checkout status and notes
 - 11) Equipment Reports – Provide reports showing trended points and available network points
- p. Custom Reports. Operator shall be able to create custom reports that retrieve data, including archived trend data from the system, and then organize the data and present results in tabular or graphical format. Reports shall be launched from the operator interface.
- q. Graphics Generation. Graphically based tools and documentation shall allow Operator to edit system graphics, to create graphics, and to integrate graphics into the system. Operator shall be able to add analog and binary values, dynamic text, static text, and animation files to a background graphic using a mouse.

- r. Graphics Library. Complete library of standard HVAC equipment graphics shall include equipment such as chillers, boilers, air handlers, terminals, fan coils, and unit ventilators. Library shall include standard symbols for other equipment including fans, pumps, coils, valves, piping, dampers, and ductwork. Library graphic file format shall be compatible with graphics generation tools.
9. Timed override reporting
- a. The DDC system shall track all push button timed override events during unoccupied periods. The system shall store time of the override event and time duration for each override event.
 - b. Web server shall allow operators to create custom reports detailing timed override events. Timed override reports shall allow the following options:
 - 1) Minimum billing time. A minimum amount of time that each override event will last.
 - 2) Billing rate. A monetary rate per hour or per minute of the override duration.
 - 3) Exemption times. A defined block of time during each week that is exempt from detecting override events.
 - 4) Allowances. A dollar amount of override usage that is allowed per tenant and is given at no charge. This allowance will be subtracted from the tenant's total override usage.
 - c. Web server shall allow an operator to manually generate each tenant override report on as-needed basis or allow for automatic report generation and emailing.
10. Web services data exchange
- System shall support Web services data exchange with any other system that complies with XML (extensible markup language) and SOAP (simple object access protocol) standards specified by the Web Services Interoperability Organization (WS-I) Basic Profile 1.0 or higher. Web services support shall as a minimum be provided at the workstation or web server level and shall enable data to be read from or written to the DDC system.
- a. System shall support Web services read data requests by retrieving requested trend data or point values (I/O hardware points, analog value software points, or binary value software points) from any system controller or from the trend history database.
 - b. System shall support Web services write data request to each analog and binary object that can be edited through the system operator interface by downloading a numeric value to the specified object.
 - c. For read or write requests, the system shall require user name and password authentication and shall support SSL (Secure Socket Layer) or equivalent data encryption.
 - d. System shall support discovery through a Web services connection or shall provide a tool available through the Operator Interface that will reveal the path/identifier needed to allow a third party Web services device to read data from or write data to any object in the system which supports this service.
11. Open Protocol Communications Existing (i-Vu Plus)
- DDC system shall allow communication to existing CCN controllers and ancillary systems or controllers, such as lighting system or VFD controllers that utilize BACnet, Modbus, or LonWorks communication protocols.

- a. BACnet communication
 - 1) DDC System shall support BACnet/IP addressing as specified in ASHRAE/ANSI 135-2001, BACnet Annex J using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol.
 - 2) DDC System shall support BACnet MS/TP communications using EIA-485 twisted pair topology running at 9600, 19200, 38400, and 76800 baud.
- b. Modbus communication
 - 1) DDC System shall support Modbus RTU/ASCII communications over EIA-485/EIA-232 type network at 9600, 19200, 38400, and 76800 baud.
 - 2) DDC System shall support Modbus TCP/IP communications over ISO 8802-3 (Ethernet) Data Link/Physical layer protocol.
- c. LonWorks communication
 - 1) DDC system shall support LonWorks communication utilizing ANSI/EIA-709.1 communications over FT-10A network.
 - 2) Communication between devices shall be via Standard Network Variable Types (SNVTs).

COMMUNICATION BUS

F. Wiring and Raceways - Communications Bus (When Part of a Network)

General:

Provide copper wiring, plenum cable, and raceways as specified in the applicable sections of Division 16.

All insulated wire to be stranded copper conductors, UL labeled for 90C minimum service.

The Communications Bus shall be a three-conductor cable with shield. EIA Standard RS-485 Communication's protocol shall be employed. The communications bus shall comply with FCC Part 15, Subpart J, Class A for bus radiated and conductive noise.

Communications Bus shall be capable of having multiple system elements connected. Each Communications Bus shall allow for the use of modules as an interface to secondary Buses.

Whenever the Communications Bus enters or leaves a building, the Bus shall be provided with adequate lightning suppression devices.

The Communications Bus shall be capable of communicating through a telephone modem to a remote building. This interface shall allow any EMS operator's station, as applicable, to communicate with any other remotely located, compatible, communications bus.

G. Local Area Network (LAN)

The LAN shall allow controllers and the main panel to be linked together and to the operators workstation through an Ethernet connection to the Owner's LAN, where DDC data will be transmitted as TCP/IP and appear as web pages on the operators workstation or any computer on the State of Connecticut Department of Mental Health and Addiction Services network with the proper security information. The operator's workstation shall be the same type computer as described herein.

Functions and displays of any controller on the LAN shall be available to any other controller or computer on the LAN. Point information may be passed from one control unit to another.

Control units may be added to the LAN at any time without affecting the operation of the system. Workstation may be logged on or off of the LAN at any time. The DDC LAN shall utilize either the LON or BacNet protocols, or both with suitable gateways. The architecture of the system shall allow access to system displays on the workstation and over the Owner's building LAN and the State of CT LAN using TCP/IP protocol with the information displayed as web pages needing no software to view other than a common internet browser such as Microsoft Internet Explorer.

Alarms from control CPU's may be routed to other computers on the LAN. Alarms shall be categorized into a minimum of 42 different alarm types. Each alarm type may be individually set to be received at each LAN terminal. Reception of alarms at an operator terminal may be controlled via time schedule. All assignments shall be fully user programmable.

LAN communication shall be over LAN cabling which shall comply with BACnet and/or LON standard. Communication rate shall be at a minimum of 384,000 baud providing operator with virtually no delay in screen updates. LAN system shall utilize coprocessor within each terminal to handle all data transfer details to maintain transmission integrity. LAN systems requiring LAN "servers" shall not be acceptable. All software and hardware necessary for LAN support shall be included in operator's terminals.

H. Display Capability

The operator and other users shall be able to select from various web pages to display all system information, simply by using the mouse. No acronyms or typed commands shall be permitted for system operation. Displays shall be linked together in any sequence to allow operator to move about the system in an orderly format as may be desired.

Dynamic color graphics of HVAC systems shall be provided. All setpoint and input/output points shall be dynamically displayed. Zone temperature, status and setpoint data shall be dynamically displayed in color on scale floor plan drawings. Designer shall provide CAD backgrounds for the vendor to use in preparation of floor plan displays.

Provide link (GIS) to electronic text file from each unique DDC system graphic so that operator can easily refer to the equipment sequence of operations and project specific notes. Program link allowing files to be updated in the future using proper access code or security setting.

MISCELLANEOUS FUNCTIONS

I. Real-Time Clock/Battery Standby Power

Real-time clock shall be self-contained and accurately controlled by a quartz crystal. The clock shall be set via the keyboard/pad and may be viewed on the display. A battery standby power supply shall be used to maintain clock operation when primary power fails. When primary power returns, the system shall automatically "reboot" to the appropriate schedules and require no action from maintenance personnel to reinitialize. Battery back-up shall be provided for 360 days of clock operation. Time shall be automatically adjusted for daylight savings time changeover. Start and end dates of daylight savings time shall be easily programmed by operator. Clocks on all DDC Computers shall be automatically updated based on the global controller CPU clock.

J. Uninterruptable Power Supply

UPS shall provide power to the DDC CPU (main panel) and have 10 minutes of back-up power available to continue operation of the DDC CPU in the event of short power outages or transition to stand-by generator power (if available).

K. Password

Programmable password which can accept alpha-numeric characters that references a user name. Password will not be needed for access to monitoring programs. A minimum of 32 passwords shall be available. Each password may have one of ten security levels and one user name assigned to it. Each CPU function and each entry type may be individually assigned one of the ten security levels. An example of an individual CPU function would be access to time schedules. An example of an entry type would be changing the setpoint for a zone.

A user's audit log shall record on disk the name of the individual who has logged into the system. Every change to the system that is made by that individual shall also be recorded. This provides a running tally of who did what to the system. Minimum of 2000 changes shall be logged and saved to hard disk.

Logged entries may be viewed on screen by the operator. Operator may scroll through entries on the screen until the point of interest is found. Operator may also print entire log or portions of log.

L. Disk System

EMCS shall be able to store data base on hard disk or load a data base from the disk. This shall be accomplished locally at the operator's station. Operator will be able to program system to automatically dump data base to disk storage system at end of each day for the purpose of updating all point data information.

All logs shall be automatically stored to disk every 5 minutes maximum. This prevents loss of data due to power interrupt or controller failure.

M. Alarm Program

1. For each analog input point, provide operator assignable high and low alarm limits.
2. For each analog or digital input, provide the following assignable alarm responses:
 - a. Sound horn or flash remote light as directed on alarm occurrence.
 - b. Display point English-language description on reserved area of the screen.
 - c. Print out alarm description and operator created alarm message.
 - d. Require acknowledgment by operator and print occurrence if directed by owner.
 - e. Store previous 360 alarms, with description, time of occurrence, time of acknowledgment, and time of return to normal. Provide for review of alarm history on CRT printer.
 - f. Provide programmable alarm messages. Alarm message shall be displayed upon acknowledgement of alarm.
 - g. Alarm message shall be up to 21 lines by 80 characters wide and may include graphics.
 - h. Each alarm may be locked out, that is not allowed to occur, if a piece of equipment is off and the alarm point not controlled.
 - i. Send alarm to remote site or digital pager.
 - j. Close contacts for security system alarm interface

3. Any time there is an alarm condition it shall be indicated on any screen that the point is displayed on. This alarm indication shall remain on the screen next to the point until the point has returned to its normal condition even if the alarm has been acknowledged.
4. See Section 230901 for additional alarm requirements.

N. Maintenance Alarms

1. The following digital inputs (i.e., equipment status) shall be set up to trigger a maintenance alarm. Maintenance alarms shall be generated based on runtime, by date, or by measurement.
 - a. All air moving equipment filter and fan belt status
 - b. All roof mounted equipment (i.e. exhaust/supply fans, make-up air units)
2. Operator shall have capability to set run time limit up to 64,000 hours and to set operational limits for measured points. Limit shall be compared by system to run time hour accumulation and alarm generated when limit is exceeded.
3. Operator shall optionally set date for generation of maintenance alarms. Alarm shall be generated at that date.
4. Acknowledgement of alarm shall bring up pertinent maintenance message for that alarm. Maintenance message may be printed when displayed.

O. Logs

1. Trend log: Provide capability for future implementation of 200 general purpose trend logs plus ten electrical demand trend logs for a total of 210. Every trend log may be assigned up to 6 points with an interval sampling rate of 1 to 255 minutes. Optionally, each log may be set up to log information only when there is a change in the information being recorded. Store date and time each entry is recorded.
2. Data which shall be logged may consist of any DDC point. Each of the 200 trend logs can be assigned individual start and stop times/dates at the terminal in advance. System shall automatically begin entry into each log as scheduled. Each point in the log shall have 1440 entries. As the log fills up all new data shall overwrite the oldest entries. All data shall be stored periodically on the hard disk for future retrieval.
 - a. Data may be viewed in tabular or graphical format. Tabular format shall allow the operator to quickly list on the page data for all six entries on each log. Operator may scroll through all 1440 entries to find the time period of interest. Date and time shall be shown for each entry. Printing of data from log shall not inhibit operator from viewing other logs or moving on to other functions.
 - b. Graphical format shall display a minimum of 3 points from each trendlog on a single graph. Information shall be shown for 24 hour interval, but may be zoomed in on using the mouse. Operator uses mouse to choose first the earliest point of interest on the left side of the graph, then the latest point of information. Graph shall be redrawn with information in its expanded format.
 - c. Data may also be panned through to find the 24 hour period of interest using mouse. Operator slides mouse cursor across color bar that is below the graph until the date and time of interest is reached. Operator clicks mouse button and graph is redrawn with new 24 hour period shown. The graph of this new 24 hour period may also be zoomed in on as described above.
 - d. Dates and times shall be shown on the graph. Minimum and maximum values for each of the 3 points shall also be shown. Actual value of each graph at a specific time may be easily found by placing the mouse at the time period of interest.

- e. Graphs may be printed on normal ink-jet printer.
- 3. Current Alarm log: Display all points currently in alarm. User may easily scroll through all alarms.
- 4. Alarm History: Display running tally of alarms that have occurred. Record the LAN site that the alarm came from and description of alarm. Description of alarm shall be in standard English and shall be easily changed by the operator if necessary. Also record date/time that alarm occurred, when it was acknowledged, and when it returned to normal operating parameters.
 - a. User shall be able view on the display all information in the alarm history log and be able to scroll rapidly through all entries to find the date and time of interest. Printing of alarm history log shall not inhibit the operator to move onto other functions or logs.
- 5. Energy Logging: System shall provide a minimum of 30 logs of energy usage and demand. Each log shall log demand and consumption along with the high, low and average outside air temperature. Logs shall be displayed on a daily and monthly basis. Set up logs for all energy meters – KWH and BTU.
 - a. Daily summaries shall be easily scrolled through to find date of interest. Time of peak demand shall be shown for each day. Printing of log shall not stop operator from moving onto other functions or logs.
 - b. Monthly summary shall display information for one year with totalization of consumption at the bottom of the display. Peak demand along with the date and time it occurred shall be shown for each month and for the year. The average, minimum and maximum outside air temperature shall also be show for each month and for the year.
- 6. Set up trend logs of parameters identified by owner or engineer from list provided at substantial completion. Add additional trend logs as needed for troubleshooting.

TEMPERATURE SENSORS

- P. Resistance temperature detectors with resistance tolerance of plus or minus 0.1 percent at 21 degrees C. interchangeability less than plus or minus 0.2 percent C, time constant of 13 seconds maximum for fluids and 200 seconds maximum for air.
- Q. Measuring current maximum 5 mA with maximum self-heat of 0.017 degrees C/MW in fluids and 0.008 degrees C/MW in air.
- R. Provide three lead wires and shield for input bridge circuit.
- S. Use insertion elements in ducts not affected by temperature stratification or smaller than one square meter. Use averaging elements where larger or prone to stratification sensor length 2.5m or 5m as required.
- T. Insertion elements for liquids shall be with brass well with minimum insertion length of 2.5 inches (60 mm). Furnish wells for installation by mechanical contractor.

- U. Provide sensors with locking cover, if not inherently tamper-proof or inconspicuous. Provide temporary timed override. Build this feature into space temperature sensor in the form of a pushbutton. Provide occupant setpoint adjustment. Influence of slide on setpoint shall be operator input.
- V. Provide outside air sensors with watertight inlet fitting, shielded from direct rays of sun. Mount on northern building exposure.
- W. Space Temperature Sensors:
 - 1. Space sensors in locations where there is no existing sensor shall be wireless.

TRANSDUCERS

- X. Relative Humidity Sensor – 4-20 Ma output, loop powered
 - 1. 3%- (Wall Mounted) - Kele model HW30K or equal.
 - 2. 3% duct-mounted – Kele HD-30K
 - 3. 3% Outdoor air – Kele HO30K
- Y. Carbon Dioxide Sensor (Duct Mounted): Kele model CD-AD or equal. Wall mounted; Kele model CD-AW-LCD
- Z. Liquid differential pressure transmitter
 - 1. Moodus W30 – 24 VDC input, 4-20ma output, +-0.5%accuracy. Provide power supply
 - 2. Bypass valve assembly – Kele BVA-5 mounted and pre-piped in NEMA 1 enclosure.
- AA. Air differential pressure transmitter
 - 1. Moodus M40, 3" w.g range, 1% range accuracy, 4-20 ma output, 24 vac or 120 vac input. Provide power supply (if not 120 vac)
- BB. Water Flow Sensor. Accuracy – 1% Full Scale, Linearity 0.7% Full Scale, Repeatability 0.7% Full Scale. Velocity range 0.5 to 15 fps. Non-magnetic impeller, 221°F max temperature.
 - 1. Pipe size ½" to 1 ½" – equal to Data Industrial (Kele) 250B tee-mounted with cast bronze tee housing.
 - 2. Pipe Size 2" – equal to Data Industrial (Kele) 228B-2 brass sensor in 2" brass tee or 228C-2 with cast iron tee (for steel pipe)
 - 3. Pipe size 2 ½" and greater equal to Data Industrial (Kele) 226B, brass insertion type with ball valve.
- CC. Water Flow Transmitter. Accuracy – 0.5% full scale, input frequency – 0-1KHz, operating temperature 0-70°C. Compatible with flow sensors above.
 - 1. Outputs – Pulse and 4-20 MA Analog
 - 2. Supply voltage – 24 VDC @ 60 MA
 - 3. Provide enclosure, optional flow display and totalized flow
 - 4. Equal to Kele VFT-1AE3
 - 5. Note: Use of simple flow transmitters such as this one requires that the DDC system totalizes GPM from the pulse or analog output. Contractor may alternatively provide a hardware totalizer or combination transmitter totalizer with a DDC output compatible with

the DDC network protocol. Totalized GPM shall be stored in a non-volatile memory in the DDC system.

- DD. 3-Phase Power Monitor – equal to Kele – PT9500-D-S with network communication module
1. 5A current transformers – split or solid core as required.
 2. Integral CT shorting assembly
 3. Pulse output for KWH with selectable pulse rate
 4. 2-line LCD display
 5. Enclosure
 6. Outputs – two 4-20 MA
 7. Display KWH, window KW, total KW, peak window KW, total power factor, total KVA, true RMS voltage
 8. Network communication module shall be compatible with DDC network protocol – otherwise provide gateway.

CONTROL DAMPERS

EE. Dampers: AMCA-rated (AMCA Std 500), parallel (Mixing Applications) and opposed (Control Only)-double-piece blade design; 22-gauge galvanized steel mechanically joined. Frame shall be constructed of 13-gauge galvanized steel sheet mechanically joined with linkage concealed in the side channel to eliminate noise and friction. Provide compressible spring stainless steel side seals and self lubricating bearings. Damper blades shall have a maximum blade width of 8 inches and length of 48 inches. Linkage shall be 1/8" end rolled steel, zinc plated, concealed with 3/8" zinc plated blade pins, self lubricating bronze bearings, self compensating stainless steel side seal equal to Johnson VD-1320 (Class II). Contractor shall field verify type, size and actuator location for each damper prior to ordering.

1. Operating Temperature Range: From minus 40 to plus 200 deg F.
2. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.
3. Provide damper accessories and jackshaft kits as necessary for complete installation.

FF. Damper Actuators:

1. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for fail safe operation. Provide with all accessories and mounting hardware. Belimo spring return actuator or equal.
2. Modulating (4-20ma) type. All outside and relief air damper actuators shall be normally closed, spring return type. Return air dampers shall be normally open.

CONTROL VALVES

GG. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated equal to Belimo.

HH. Hydronic system globe valves shall have the following characteristics:

1. NPS 2 and Smaller: Class 250 bronze body, stainless steel trim, rising stem, renewable composition disc, and screwed ends with backseating capacity repackable under pressure.

2. NPS 2-1/2 and Larger: Class 250 iron body, stainless steel trim, rising stem, plug-type disc, flanged ends, and renewable seat and disc.
 3. Internal Construction: Replaceable plugs and stainless-steel brass seats. Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom.
 4. Sizing: 3-5psig maximum pressure drop at design flow rate.
 5. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
 6. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of total system (pump) head.
- II. Hydronic System Ball Valves – Bronze body with stainless steel ball and shaft. Two or 3-way pattern. Manufactured by Apollo, Belimo or Kele. Configure for Belimo Actuator.
- JJ. Valve Actuators: For modulating service, actuator shall utilize 4-20 ma position signal, 24 VAC power and have normally safety position spring return arranged for normally open valve position. Spring return actuator with globe or ball valve equal to Belimo.

CONTROL CABINET & ENCLOSURES

- KK. Provide cabinet and/or enclosures for each piece of HVAC equipment controlled as part of this project. Devices mounted within any given cabinet shall serve the same piece of HVAC equipment. Provide mounting back plate within cabinet/enclosure for relays, indicators, pressure gages, pilot lights, pushbuttons, switches and controls.
- LL. Cabinet: Provide aluminum control cabinet for mounting control devices, and electrical components/devices. Cabinet shall have extruded aluminum alloy frame, removable (aluminum clad) face and back panels, piano hinge (field adjustable to open right or left), key lock latch (provide two keys to owner), UL listed NEMA type-1 rating equal to Versa-Cab by Kele USA.
- MM. Enclosure: Provide metal enclosure (with powder-coat finish) for mounting control system electronics, switches and wiring. Enclosure shall have removable door, powder coat exterior finish (gray or blue), perforated back panel for easy mounting of devices, piano hinge (field adjustable to open right or left), key lock latch (provide two keys to owner), UL listed NEMA type-1 rating equal to RET Series by Kele USA.
- NN. Control functions shall be consolidated in DDC panels or terminal control units (TCU's) located in convenient accessible locations such as closets, storage, mechanical and utility rooms that are near groups of points. DDC panels shall not be located above ceilings, classrooms, or other places where access is similarly difficult, inconvenient or inappropriate. Small TCU's associated with small equipment such as fan coil units may be mounted on or near the unit.

POWER SUPPLIES & TRANSFORMERS

- OO. Provide power transformers and power supplies in quantity and sizes as necessary to make system fully operable using the voltage available within the building. Coordinate power requirements with the work of other divisions.

- PP. Power supplies shall be suitable for powering control circuits in HVAC systems, multi-tap primary connections, manually resettable circuit breaker, foot or hub mounting, UL listed, CSA approved NEC class 2 "not wet".
- QQ. Provide protection using a fuse for both primary and secondary sides of the transformer.

RELAYS (PILOT & POWER)

- RR. Provide relays, contacts and interface devices for connection of controlled devices and DDC system TCU's. Provide relays and contactors in quantity and sizes as necessary to make system fully operable and automatic.
- SS. Pilot & Power Relay: Relay having contacts rated for switching low-horsepower and control loads. Relay shall come enclosed, pre-packaged and wired for field mounting using 1/2" or 3/4" NPT nipple (from which all wires exit) allowing for mounting externally to enclosure or cabinet. Provide relay with status indicator light, open/close/auto switch, UL listing, voltage and current rating as necessary to match controlled device power requirements. Relay shall be equal to Relay In a Box (RIB) pilot or power series.

CURRENT SWITCHES

- TT. Provide current switches for monitoring status of motor driven equipment such as pumps, and fans. Provide current switches in quantity and sizes as necessary to interface with control system and equipment. Coordinate power requirements of load with current range of switch.
- UU. Direct Drive Fans, Pumps and fixed loads: Hawkeye 600/800 series mini-split & solid core fixed set-point digital point current switch. Provide with UL rating.
- VV. Belt Drive Fans, Pumps and variable loads: Hawkeye 608 series mini-split & solid core adjustable low set-point digital point current switch. Provide with UL rating.

LIMIT SWITCHES

- WW. Provide limit switches where shown or indicated on the drawings. Limit switches are intended to protect or limit equipment or device operation for safety purposes. Contractor shall coordinate device set-points with the system operating conditions and test to make sure measured variable actuates limit switch to obtain intended operation limits.
- XX. Low Temperature "Freeze-Stat": Low limit temperature control/switch with vapor filled, copper capillary (responsive to lowest temperature sensed) 5/64"x20 ft long affixed to the face coil, automatic reset, DPDT switch, test lever and visible set-point through front cover, UL listed, Adjustable set-point equal to Honeywell or Dynacon

CONTROL CABLE

- YY. Provide plenum rated control system cabling and wiring in accordance with Division 26 and manufacturer type and sizing requirements.

SMOKE DETECTORS

- ZZ. On systems equipped with existing or new supply and/or return air smoke detectors, all unit fans shall shut down on detection of smoke. This control shall be furnished and hard-wired into motor controls by Division 26 and to fire alarm system by Division 28. New Duct smoke detectors if required shall be furnished by Division 26. The smoke detectors shall be mounted to the ductwork by Division 23. See additional requirements in 23 09 01 – Sequence of operations.

PART 3 - EXECUTION

GENERAL

- A. Install in accordance with manufacturer's instructions.
- B. Existing DDC equipment (sensor wiring, sensors (if they pass a calibration check), panel enclosures, so long as the Contractor warrants them as new.
- C. Verify that power supply(s) are installed, working and available to control units and operator workstation.
- D. Verify that duct, pipe, and equipment-mounted devices are installed before proceeding with installation.
- E. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation. Interface system with building and State LAN. Implement State security requirements. Software for controls shall be configured and installed by DDC contractor. Software and hardware shall facilitate local modification on-site by installing contractor. It shall not be necessary to involve the factory for simple changes in operational sequences required for commissioning, de-bugging or any other reason.
- F. Connect and configure equipment and software to achieve sequence of operation specified.
- G. Verify location of control devices including thermostats, humidistats, and other exposed control sensors with the contract documents before installation. Install wall mounted devices 48 inches above the finished floor. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
- H. Label ends of wires and cables (both ends) so that input and output wiring can be positively identified with the associated DDC point. Labels shall be consistent with the as-built control schematics and wiring diagrams.
- I. Install guards on thermostats and sensors (where not inherently tamper proof) in the following locations:
 - 1. Entrances.
 - 2. Public areas.
- J. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.

- K. Install labels and nameplates to identify control components.
- L. Install power wiring and cables according to Division 26 sections.

ELECTRICAL WIRING AND CABLING INSTALLATION

- M. Install all electrical work in accordance with Divisions 26, 27, and 28. Electrical material and installation shall be in accordance with appropriate requirements of Divisions 26, 27, and 28 and shall be in accordance with the NEC.
- N. Install wiring and cable as follows:
 - 1. All low voltage and LAN wiring shall be plenum-rated cable conforming to NFPA 90A and tested in accordance with NFPA 262.
 - 2. Cable and wiring run in mechanical spaces shall be in raceway for protection.
 - 3. Cable and wiring run in concealed spaces shall be in raceway for protection and future access. Provide J-box at each end of raceway in accessible location.
 - 4. Properly support cable located above ceilings - do not drape it loosely over other utilities or on top of suspended ceiling pads. Do not tie cable to mechanical piping, ceiling suspension system or support in a manner that would impede maintenance.
 - 5. Provide cable trays or J-hooks to organize DDC wiring above ceiling.
 - 6. Color code DDC cable and I/O wiring so that it can not be confused with other technology cable. Label both ends of each wire and cable.
 - 7. Any accessible control system cabling or pneumatic tubing made unnecessary by the work of this project shall be removed.
 - 8. Wiring in finished spaces shall be concealed. Use EMT in CMU and stud walls or other situations where fishing out/in a new cable would be difficult. Where concealing wiring is impossible, use surface raceway.
 - 9. All line voltage control wiring shall be provided in raceways.

FIELD QUALITY CONTROL

- O. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust all control components and equipment installation, including connections. Provide written report of findings.
- P. Perform the following field tests and inspections and prepare test reports:
 - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
 - 2. Test and adjust all controls and safeties.
 - 3. Test each point through its full operating range to verify that safety and operating control set points are as required.
 - 4. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
 - 5. Test each system for compliance with sequence of operation.
 - 6. Test software and hardware interlocks.
- Q. DDC Verification:
 - 1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
 - 2. Check instruments for proper location and accessibility.

3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
 4. Check instrument tubing for proper fittings, slope, material, and support.
 5. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
 6. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
 7. Check temperature instruments and material and length of sensing elements.
 8. Check control valves. Verify that they are in correct direction.
 9. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.
 10. Check DDC system as follows:
 - a. Verify that DDC controller power supply is from emergency power supply, if applicable.
 - b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
 - c. Verify that spare I/O capacity has been provided.
 - d. Verify that DDC controllers are protected from power supply surges.
- R. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

ADJUSTING

- S. Calibrating and Adjusting:
1. Calibrate instruments.
 2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
 3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
 4. Control System Inputs and Outputs:
 - a. Check analog inputs at 0, 50, and 100 percent of span.
 - b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
 - c. Check digital inputs using jumper wire.
 - d. Check digital outputs using ohmmeter to test for contact making or breaking.
 - e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
 5. Flow:
 - a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
 - b. Manually operate flow switches to verify that they make or break contact.
 6. Pressure:
 - a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
 - b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.

7. Temperature:
 - a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
 - b. Calibrate temperature switches to make or break contacts.
 8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
 9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
 10. Provide diagnostic and test instruments for calibration and adjustment of system.
 11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.
- T. Adjust initial temperature and humidity set points.

FIELD SERVICES

- U. Provide a minimum of two Start-Up (post construction) meetings. Give Owner two week notice to attend meetings. Provide one meeting during the summer and another during the winter. At each meeting contractor shall demonstrate the DDC system operation. The contractor shall be flexible to accommodate Owner's schedule. Demonstrate all operating modes, displays and alarms. The scope of the demonstration meetings shall include (at minimum) the following:
1. Verify accuracy of all analog measurements from sensor through software to dynamic display. Use calibrated fixed or variable substitution resistances to simulate temperature for monitoring points and all temperature dependent modes of operation and alarms. Use temporary switches to simulate all binary inputs.
 2. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.
 3. Ensure major mechanical systems under DDC control have been through their own official start-up and commissioning before control commissioning.
- V. Provide follow up phone call after each meeting to review owner's questions with control system and operating parameters.
- W. Provide on site service engineer to conduct two basic operators training meetings (in addition to demonstration meetings) for up to 4 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include hands-on training at every control panel/cabinet location for every major system under control.
- X. Provide a minimum of 4 hours dedicated instructor time on site using operator's workstation at interface to the control system. Conduct follow up phone calls to ensure all Owner's maintenance personnel understand and can operate the control system.
- Y. Provide all personnel and services required to support commissioning as specified in Section 019113.
- Z. After the expiration of the warrantee period, turn over to the owner source code of sequence of operations installed by DDC contractor for this installation. Provide security information (hardware locks and highest level passwords) necessary for access to system for custom

programming need for changing sequence of operations by owner designated independent contractors. Furnish software licenses as required at no cost to owner.

END OF SECTION 230900

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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 Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Temperature Control –General and Occupancy Status
- B. Sequence of Operations – Boilers/Hydronic System
- C. Sequence of Operations –Air Handling Units (AHUs), Hydronic Heating
- D. Sequence of Operations – Electric Reheat Coils, Electric Baseboard Radiation

1.3 SYSTEM DESCRIPTION

- A. This Section defines the arrangement of the controls and manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are generally specified in other Sections. Provide all labor and material required to satisfy the requirements of this Section whether or not specified elsewhere.
- B. Provide all input and output DDC points including input transducers and output interfaces to implement this sequence of operations. Provide standard or implied sequence of operations for all points shown or scheduled for which no sequence of operations is mentioned in this Section.
- C. Many of the control points required for these sequences of operations are existing in the Automated Logic system currently in place. These points may be used along with new points provided under this project to implement the sequences of operations. Existing points shall be warranted by the contractor as new.

1.4 SUBMITTALS

- A. Contractor's version of the sequence of operations for all controlled equipment shall be submitted with DDC control system submittals on same page as equipment control diagrams and points list for that equipment.

1.5 TRAINING

- A. Provide two, four-hour training sessions for the facilities personnel.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products mentioned in this section shall be as specified in other Divisions 23 sections of this manual and as indicated on the Drawings.

PART 3 - EXECUTION

3.1 SEQUENCE OF OPERATIONS

- A. Existing Conditions:
 - 1. The existing electric resistance heating equipment shall remain in place and be controlled essentially as it is controlled at present. There are approximately 145 duct-mounted electric reheat coils serving individual rooms. Each is controlled by a single-set-point, pneumatic thermostat. For each floor, the room thermostats on each of the building's long exposures (east and west) are enabled or disabled as a group by the existing direct digital control system (DDC). If any space temperature sensor on a given exposure of a given floor detects a temperature below set-point, the DDC enables all the room thermostats on that exposure of that floor by sending them 15-psig control air. If no space temperature sensor on a given exposure of a given floor detects a temperature below set-point, the DDC disables all the room thermostats on that exposure of that floor by sending them 20 psig control air, locking out the reheat coils. In addition, the DDC disables all the room thermostats if the outside air temperature is above 60°F.
 - 2. All perimeter rooms have electric baseboard radiation. Each individual piece of radiation is controlled by an on-board line voltage thermostat, but its operation is subject to the following permissive controls. There is one SCR controller for the electric perimeter radiation system serving each floor. The DDC enables the SCR controller for a given floor if at least one space temperature sensor on the east exposure and at least one space temperature sensor on the west exposure of that floor detect temperatures below set-point. The SCR controller modulates the electric current supplied to the radiation based on outside air temperature. In addition, the DDC disables the baseboard radiation if the outside air temperature is above 50°F.
- B. New Temperature Control – General:
 - 1. The upgraded DDC control system will have additional space temperature sensors in non-patient areas (Ground, 1st, 2nd, 3rd, & 4th floors) to be incorporated into the electric heat control scheme. In addition, control sequences in this specification are designed to minimize the use of the existing electric resistance heating equipment and maximize the use of fossil-fuel-based heating equipment.
 - 2. Sequences of operations shall be implemented using DDC logic and a combination of electronic and pneumatic actuation. Control functions shall be consolidated in existing DDC panels or in new panels located in convenient accessible locations such as mechanical rooms, closets or storage rooms near groups of points or where shown on Drawings. DDC panels shall not be located above ceilings or other places where access is similarly difficult or inconvenient.
 - 3. Patient areas (5th through 8th floors) and the security offices on the ground floor shall remain in the occupied mode continuously. For the remainder of the building, occupied/unoccupied status shall be determined by a DDC controller clock for the various zones. A zone consists of the

area serviced by any air handling unit branch distribution system or a piece of terminal heating or cooling equipment. Other major pieces of equipment shall be considered zones. The system shall provide separate scheduling capability for at least 200 zones.

4. All set-points specified in this Section shall be adjustable (adj), within reasonable limits, through operator's or other authorized remote workstations. Operator and Engineer shall have remote access to all adjustments through web-based user-friendly graphical interfaces.
5. Alarm all critical status, flows and all serious set-point deviations. Acquire and display all alarms generated by controls integral with equipment whether shown or mentioned specifically. Alarms shall have 2 levels of severity and resulting system action:
 - a. Critical Emergency - DDC system alarms building security system, which in turn calls out by telephone to list of designated responsible individuals. DDC also alarms operator's workstation. This category is restricted to those items, which would cause injury, property damage or substantial disruption to building operation, if not addressed immediately. Examples would be a coil freeze alarm not responding to freeze protection corrective action, low zone temperature approaching freezing conditions, etc.
 - b. Ordinary Alarms - system alarms operator's workstation.
6. General Air-handling Unit (AHU) Operating Parameters:
 - a. AHU fans shall operate continuously during the occupied periods, and shall cycle during the unoccupied periods in the heating season, using 100% return air.
 - b. If freeze-protection capillary bulb thermostat in an AHU senses a temperature of 40°F (adjustable), the AHU heating coil control valves shall go to full open and an alarm shall be sent to the operator work station. Outside air dampers shall close, return fans shall remain running, any exhaust fans associated with the air system shall shut down.
 - c. Existing fire alarm smoke or heat activated AHU supply and return fan shut-down cycles shall remain fully functional and/or be improved as a result of this work.
 - d. AHU zones shall be indexed to heating or cooling mode depending on sensed space temperatures.
 - e. Optimal Start: DDC shall calculate how long it will take to return from its unoccupied state to its occupied set-point based on the heating or cooling capacity and the outside air temperature. The DDC will then adjust the AHU start time in order to ensure the desired zone conditions when occupants arrive. During optimal start-up periods the AHU shall operate on 100% return air, except when outdoor air can be used for cooling (economizer).
7. Exhaust Fan Control:
 - a. DDC shall enable all building exhaust fans currently in service during occupied hours and disable them during unoccupied, warm-up and cool-down hours unless otherwise indicated below.
- C. Fire Cycle – Existing Air handler sequences for shut-downs upon detection of smoke shall, at a minimum, be maintained operational and not impaired or reduced in code compliance by any

part of this work. This includes smoke detector connection to the fire alarm system as well as the hardwired or software supply air shutdown through the smoke detector auxiliary contacts.

1. Contractor shall survey the air handlers to determine which of the AHU's supplying over 2000 CFM have existing smoke detectors installed on their supply ducts and which shut down the air handler supply and return fans upon detection of smoke. Contractor shall also determine which AHU's do not have supply air smoke detectors, which have return smoke detectors, and if any smoke detectors are not installed in accordance with current IMC code requirements. Prior to any control work or demolition, Contractor shall test the fire cycle of all of said air handlers regardless of smoke detector location. Obtain and provide the services of the fire alarm vendor/contractor currently serving the facility to assist as required in the survey and testing of the fire cycle shutdown and fire alarm HVAC interface to each AHU. This testing shall be witnessed by the DCS code official and state fire marshal.
2. Contractor shall prepare a written fire cycle inspection report and present it to the DCS project manager and the Engineer.
3. Upon review of the inspection report by DCS code review, the DCS construction manager may request a proposal for remedial action to bring the smoke detection and HVAC fire cycle into code compliance.
4. At the end of the project, regardless of the scope of any remedial work done, fire cycle testing shall be repeated and witnessed as above.

D. Heating System Control:

Secondary hydronic pumps and boilers shall be enabled by DDC system when the outside air temperature drops below 55°F (adj) during occupied and warm-up hours, or below 50°F (adj) during unoccupied hours. Upon detected failure of lead pump, lag pump shall start. Lead/lag pump shall alternate weekly. The DDC system shall modulate the hot water coil control valve to provide a supplied air temperature of 72°F (adj) when the system is in operation.

1. Boiler Staging:

- a. The lead boiler and its primary hydronic pump in each of the three mechanical rooms shall be enabled when the outside air temperature drops below 50°F (adj). If the lead boiler cannot provide the required heating hot water supply temperature, the lag boiler and its primary hydronic pump shall start.
- b. DDC shall alternate lead boiler status between the two boilers in each of the three mechanical rooms on a weekly basis.
- c. The boiler water temperature for all the boilers in the building shall be reset based on outdoor air temperature according to the following schedule (adj.):

OUTDOOR AIR TEMP	BOILER WATER TEMP
50°F	100°F
0°F	180°F

2. During occupied and warm-up hours in the heating mode:

- a. DDC shall enable all the existing pneumatic room thermostats on each of the building's long exposures (east and west) if any space temperature sensor on that exposure is more than 4°F (adj.) below the occupied heating set-point by sending them 15-psig control air. If no space temperature sensor on a given exposure is

more than 4°F (adj.) below the occupied heating set-point, the DDC shall disable all the room thermostats on that exposure by sending them 20 psig control air, locking out the reheat coils. In addition, the DDC shall disable all the room thermostats if the outside air temperature is above 60°F.

- b. DDC shall enable the SCR controller of each floor if at least one space temperature sensor on the east exposure and at least one space temperature sensor on the west exposure of that floor sense temperatures below occupied set-point (70°F adj.). The SCR controller shall modulate the electric current supplied to the radiation based on outside air temperature. In addition, the DDC shall disable the baseboard radiation if the outside air temperature is above 50°F.
3. During unoccupied hours in the heating mode:
- a. DDC shall enable all the existing pneumatic room thermostats on each of the building's long exposures (east and west) if any space temperature sensor on that exposure is more than 4°F (adj.) below the unoccupied heating set-point by sending them 15-psig control air. If no space temperature sensor on a given exposure is more than 4°F (adj.) below the unoccupied heating set-point, the DDC shall disable all the room thermostats on that exposure by sending them 20 psig control air, locking out the reheat coils. In addition, the DDC shall disable all the room thermostats if the outside air temperature is above 50°F.
 - b. DDC shall enable the SCR controller of each floor if at least one space temperature sensor on the east exposure and at least one space temperature sensor on the west exposure of that floor sense temperatures below unoccupied set-point (55°F adj.). The SCR controller shall modulate the electric current supplied to the radiation based on outside air temperature. In addition, the DDC shall disable the baseboard radiation if the outside air temperature is above 45°F
- E. Air-Handling Unit Control:
- 1. AHU function shall be under the control of the DDC system.
 - 2. Cooling-only AHUs:
 - a. This unit serves the core area of the 7th floor, and it shall be monitored and controlled as is currently done.
 - 3. AHUs with Heating, Cooling, and Ventilating Capabilities:
 - a. Units serving the patient residence floors (5th through 8th floors) and the unit serving the security offices on the ground floor (AH-1) shall remain in the occupied mode continuously.
 - b. Units serving the remainder of the building shall be indexed to occupied, unoccupied, warm-up, or cool-down mode by the DDC optimal start program.
 - 4. Warm-up Hours: DDC system shall start fans far enough in advance of scheduled occupancy, as determined by optimum start program, so that the space is up to heating occupied temperature set-point (70°F adj.) as people arrive. In the warm-up mode, DDC system shall run unit fans with outside air and exhaust air dampers fully closed.
 - 5. Cool-down Hours: DDC system shall start fans far enough in advance of scheduled occupancy, as determined by optimum start program, so that the space is down to cooling occupied temperature set-point (74°F adj.) as people arrive. In the cool-down mode, DDC system shall

run unit fans with the outside air and exhaust air dampers fully closed, except when outside air (OA) is being used for cooling. (See Economizer Control below.)

6. Occupied Hours:

a. DDC system shall operate AHU fans with outside air (OA) damper in the minimum position, except as required by CO₂ and Economizer Control described below.

b. Heating Mode:

- 1) The supply ductwork of each AHU has between one and three branches, each of which shall have its own heating hot water coil (and DX cooling coil). DDC shall modulate the heating hot water coil control valve in each branch to provide the desired supply temperature to its zone. To avoid overheating, each AHU supply temperature shall be just warm enough to satisfy the smallest heating demand within the zone served. DDC shall poll the space temperature sensors in each zone, select the highest temperature, and reset each AHU's supply temperature according to the following adjustable schedule:

HIGHEST ZONE SPACE TEMP	AHU SUPPLY TEMP
60°F	75°F
70°F	70°F

c. Cooling Mode:

- 1) DDC system shall maintain occupied space temperature set-point in each zone by resetting the branch's supply air temperature. It shall do this by modulating the OA dampers, based on comparative enthalpy (see Economizer Control below), and cycling the zone DX cooling system in sequence. Each branch condensing unit shall operate when the average space temperature exceeds 73°F (adj). Simultaneous heating and cooling shall be avoided by a 3°F (adj.) deadband between heating coil operation and condensing unit operation.

- 2) Economizer Control: DDC system shall compare outdoor air and return air enthalpies. If the outdoor air enthalpy is equal to or lower than the RA enthalpy, CO₂ control shall be overridden and the OA, return air (RA), and exhaust air dampers shall modulate to maintain supply air temperature, subject to mixed air lower limit of 55 °F (adj). If the outdoor air enthalpy is greater than the RA enthalpy, OA damper shall go to the minimum position (as determined by CO₂ control).

- 3) To avoid humidity problems, supply temperature shall not be reset upward until at least one space sensor in the AHU service area is 2F (adj.)° below set-point.

d. CO₂ Control: At beginning of occupied cycle, DDC system shall position the outside air damper at its minimum position. After a 10-minute delay, it shall adjust outside air volume between 100% and 10% (adjustable) of total supply air to keep return CO₂ between adjustable limits of 600 and 800 ppm.

7. Unoccupied Hours (where applicable):

a. Heating Mode: DDC shall modulate the heating hot water coil control valve at each AHU to provide the desired supply temperature to its zone. To avoid overheating, each AHU supply temperature shall be just warm enough to satisfy the smallest

heating demand within the zone served. DDC shall poll the space temperature sensors in each zone, select the highest temperature, and reset each branch's supply temperature according to the following adjustable schedule. Outdoor air and exhaust air dampers shall be fully closed.

HIGHEST ZONE SPACE TEMP	AHU SUPPLY TEMP
50°F	55°F
54°F	55°F

- b. Cooling Mode: AHU fans shall be off, and the outdoor air and exhaust air dampers shall be fully closed.

END OF SECTION 230901

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Dampers.
- B. Damper Operators:
 - 1. Electric operators.
- C. Humidistats:
 - 1. Limit duct humidistats.
- D. Input/Output Sensors:
 - 1. Temperature sensors.
 - 2. Humidity sensors.
 - 3. Equipment operation (current) sensors.
 - 4. Damper position indicators.
 - 5. Carbon dioxide sensors.
- E. Thermostats:
 - 1. Electric room thermostats.
 - 2. Room thermostat accessories.
- F. Transmitters:
 - 1. Temperature transmitters.
 - 2. Humidity transmitters.

1.2 RELATED REQUIREMENTS

- A. Section 23 0519 - Meters and Gages for HVAC Piping: Thermometer sockets, gage taps.
- B. Section 23 0923 - Direct-Digital Control System for HVAC.
- C. Section 23 0993 - Sequence of Operations for HVAC Controls.
- D. Section 23 2113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, gage taps.
- E. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.
- F. Section 26 2726 - Wiring Devices: Elevation of exposed components.

1.3 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2012.
- B. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats; 2013.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

1.5 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PART 2 PRODUCTS

2.1 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.2 DAMPERS

- A. Performance: Test in accordance with AMCA 500-D.
- B. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage, 0.1046 inch (2.66 mm).
- C. Blades: Galvanized steel, maximum blade size 8 inches (200 mm) wide, 48 inches (1200 mm) long, minimum 22 gage, 0.0299 inch (0.76 mm), attached to minimum 1/2 inch (13 mm) shafts with set screws.
- D. Blade Seals: Synthetic elastomeric, inflatable, mechanically attached, field replaceable.
- E. Jamb Seals: Spring stainless steel.
- F. Shaft Bearings: Oil impregnated sintered bronze.
- G. Linkage Bearings: Oil impregnated sintered bronze.
- H. Leakage: Less than one percent based on approach velocity of 2000 ft per min (10 m per sec) and 4 inches wg (1.0 kPa).

2.3 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
 - 1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
- B. Electric Operators:
 - 1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.4 HUMIDISTATS

- A. Limit Duct Humidistats:
 - 1. Insertion, two position type.
 - 2. Throttling Range: Adjustable 2 percent relative humidity.
 - 3. Operating Range: 20 to 80 percent.

2.5 INPUT/OUTPUT SENSORS

- A. Temperature Sensors:
 - 1. Performance Characteristics:
 - a. Temperature Transmitter:
 - 1) Accuracy: 0.10 degree F (0.06 degrees C) minimum or plus/minus 0.20 percent of span.
 - 2) Output: 4 to 20 mA.
 - b. Sensing Range:
 - 1) Use temperature transmitters in conjunction with RTD's when RTD's are incompatible with DDC controller direct temperature input.
 - c. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
 - d. Room Temperature Sensors:
 - 1) Provide the following:
 - (a) Setpoint reset slide switch with an adjustable temperature range.
 - (b) Individual heating/cooling setpoint slide switches.
 - (c) Momentary override request push button for activation of after-hours operation.
- B. Humidity Sensors:
 - 1. Duct Mounted Sensor: Voltage type encased in a die-cast metal, weather-proof housing.
 - a. Input Power, Voltage Type: Class 2; 12-30 VDC/24 VAC, 15mA max.
 - b. Input Power, mA Type: Class 2; Loop powered 12-30 VDC only, 30 mA max.
 - c. Output Voltage Type: 3-wire observed polarity.
 - d. Output mA Type: 2-wire, not polarity sensitive (clipped and capped).
 - e. Humidity:
 - 1) Accuracy 1 percent at 10 to 80 percent relative humidity at 77 degrees F (25 degrees C), multi-point calibration, NIST traceable.
 - 2) Scaling: 0 to 100 percent RH.
 - f. Operating Environment:
 - 1) Operating Humidity Range: 0 to 100 percent RH noncondensing.
- C. Damper Position Indicators: Potentiometer mounted in enclosure with adjustable crank arm assembly connected to damper to transmit 0 to 100 percent damper travel.
- D. Carbon Dioxide Sensors, Duct:
 - 1. General: Provide non-dispersive infrared (NDIR), diffusion sampling CO2 sensors with integral transducers and linear output.
 - 2. Air Temperature: Range of 32 to 122 degrees F (0 to 50 degrees C).
 - 3. Relative Humidity: Range of 0 to 95 percent (non-condensing).
 - 4. Power Input: Class 2; 12 to 30VDC or 24VAC 50/60 Hz; 100mA max.
 - 5. Calibration Characteristics:
 - a. Automatically compensating algorithm for sensor drift due to sensor degradation.
 - b. Maximum Drift: 2 percent.
 - c. User calibratable with a minimum calibration interval of 5 years.
 - 6. Construction:

- a. Sensor Chamber: Non-corrosive material for neutral effect on carbon dioxide sample.
- b. Provide duct mounted sensors with duct probe designed to protect sensing element from dust accumulation and mechanical damage.

2.6 THERMOSTATS

- A. Electric Room Thermostats:
 - 1. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
 - 2. Service: Cooling and heating.
 - 3. Covers: Locking with set point adjustment, with thermometer.
- B. Room Thermostat Accessories:
 - 1. Thermostat Covers: Brushed aluminum.

PART 3 - PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches and humidistats. Refer to Section 26 2726.
- C. Mount freeze protection thermostats using flanges and element holders.
- D. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.
- E. Provide guards on thermostats in entrances.
- F. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors.
- G. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- H. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- I. Provide conduit and electrical wiring in accordance with Section 26 0583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION 230913

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. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Valves.
 - 5. Pressure regulators.
 - B. Natural gas piping and accessories from utility service to all gas-fired equipment and appliances.

1.3 REFERENCES

- A. The following codes and standards shall be considered part of this Specification, and all work shall be performed in accordance with them.
 - 1. NFPA 54 - Gas Piping Installation: Current Edition
 - 2. Connecticut Building Code: Current Edition

1.4 RELATED WORK

- A. Section 23 05 29 – Hangers and Supports for HVAC
- B. Section 23 05 48 - Vibration Isolation and Seismic Restraints
- C. Section 23 52 16 – Condensing Boilers
- D. Final connections to all equipment

1.5 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 65 psig minimum unless otherwise indicated.
- B. Natural-Gas System Pressures within Buildings: Two pressure ranges. Primary pressure is more than 0.5 psig but not more than 2 psig, and is reduced to secondary pressure of 0.5 psig or less.

1.6 SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Piping specialties.
 - 2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
 - 3. Pressure regulators. Indicate pressure ratings and capacities.
 - 4. Dielectric fittings.
- B. Welding certificates.
- C. Field quality control reports.
- D. Operation and Maintenance Data: For pressure regulators to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

1.9 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For motorized gas valves, pressure regulators, and service meters to include in emergency, operation, and maintenance manuals.

1.10 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

- B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
 - 1. Notify Engineer and Owner no fewer than two days in advance of proposed interruption of natural-gas service.
 - 2. Do not proceed with interruption of natural-gas service without Owner's written permission.

1.11 COORDINATION

- A. Coordinate with existing conditions and the work of other divisions.
- B. Coordinate and field verify equipment load, meter location, protection and inlet pressure requirements with gas utility.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
 - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded or butt welding to match pipe.
 - c. Lapped Face: Not permitted underground.
 - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
 - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.
 - 5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
 - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
 - 6. Mechanical Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Dresser Piping Specialties; Division of Dresser, Inc.
 - 2) Smith-Blair, Inc.
 - b. Steel flanges and tube with epoxy finish.
 - c. Buna-nitrile seals.
 - d. Steel bolts, washers, and nuts.
 - e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

2.2 PIPING SPECIALTIES

- A. Appliance Flexible Connectors:
 - 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
 - 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
 - 3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
 - 4. Corrugated stainless-steel tubing with polymer coating.
 - 5. Operating-Pressure Rating: 0.5 psig (3.45 kPa).
 - 6. End Fittings: Zinc-coated steel.
 - 7. Threaded Ends: Comply with ASME B1.20.1.
 - 8. Maximum Length: 72 inches (1830 mm).

- B. Y-Pattern Strainers:
 - 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
 - 2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
 - 3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
 - 4. CWP Rating: 125 psig (862 kPa).

- C. Basket Strainers:
 - 1. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.
 - 2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
 - 3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
 - 4. CWP Rating: 125 psig (862 kPa).

- D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.

- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F (540 deg C) complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 MANUAL GAS SHUTOFF VALVES

- A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

- B. General Requirements for Metallic Valves, NPS 2 (DN 50) and Smaller: Comply with ASME B16.33.
 - 1. CWP Rating: 125 psig (862 kPa).
 - 2. Threaded Ends: Comply with ASME B1.20.1.

3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch (25 mm) and smaller.
 6. Service Mark: Valves 1-1/4 inches (32 mm) to NPS 2 (DN 50) shall have initials "WOG" permanently marked on valve body.
- C. General Requirements for Metallic Valves, NPS 2-1/2 (DN 65) and Larger: Comply with ASME B16.38.
1. CWP Rating: 125 psig (862 kPa).
 2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
 3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 4. Service Mark: Initials "WOG" shall be permanently marked on valve body.
- D. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; a subsidiary of American Meter Company.
 2. Body: Bronze, complying with ASTM B 584.
 3. Ball: Chrome-plated brass.
 4. Stem: Bronze; blowout proof.
 5. Seats: Reinforced TFE; blowout proof.
 6. Packing: Separate packnut with adjustable-stem packing threaded ends.
 7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 8. CWP Rating: 600 psig (4140 kPa).
 9. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- E. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; a subsidiary of American Meter Company.
 2. Body: Bronze, complying with ASTM B 584.
 3. Ball: Chrome-plated bronze.
 4. Stem: Bronze; blowout proof.
 5. Seats: Reinforced TFE; blowout proof.
 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

8. CWP Rating: 600 psig (4140 kPa).
 9. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- F. Two-Piece, Regular-Port Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BrassCraft Manufacturing Company; a Masco company.
 - b. Conbraco Industries, Inc.; Apollo Div.
 - c. Lyall, R. W. & Company, Inc.
 - d. McDonald, A. Y. Mfg. Co.
 - e. Perfection Corporation; a subsidiary of American Meter Company.
 2. Body: Bronze, complying with ASTM B 584.
 3. Ball: Chrome-plated bronze.
 4. Stem: Bronze; blowout proof.
 5. Seats: Reinforced TFE.
 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 8. CWP Rating: 600 psig (4140 kPa).
 9. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- G. Bronze Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Lee Brass Company.
 - b. McDonald, A. Y. Mfg. Co.
 2. Body: Bronze, complying with ASTM B 584.
 3. Plug: Bronze.
 4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 5. Operator: Square head or lug type with tamperproof feature where indicated.
 6. Pressure Class: 125 psig (862 kPa).
 7. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- H. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. McDonald, A. Y. Mfg. Co.
 - b. Mueller Co.; Gas Products Div.
 - c. Xomox Corporation; a Crane company.
 2. Body: Cast iron, complying with ASTM A 126, Class B.
 3. Plug: Bronze or nickel-plated cast iron.
 4. Seat: Coated with thermoplastic.
 5. Stem Seal: Compatible with natural gas.
 6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.

7. Operator: Square head or lug type with tamperproof feature where indicated.
 8. Pressure Class: 125 psig (862 kPa).
 9. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- I. Cast-Iron, Lubricated Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Flowserve.
 - b. Homestead Valve; a division of Olson Technologies, Inc.
 - c. McDonald, A. Y. Mfg. Co.
 - d. Milliken Valve Company.
 - e. Mueller Co.; Gas Products Div.
 - f. R&M Energy Systems, A Unit of Robbins & Myers, Inc.
 2. Body: Cast iron, complying with ASTM A 126, Class B.
 3. Plug: Bronze or nickel-plated cast iron.
 4. Seat: Coated with thermoplastic.
 5. Stem Seal: Compatible with natural gas.
 6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 7. Operator: Square head or lug type with tamperproof feature where indicated.
 8. Pressure Class: 125 psig (862 kPa).
 9. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- J. PE Ball Valves: Comply with ASME B16.40.
1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Kerotest Manufacturing Corp.
 - b. Lyall, R. W. & Company, Inc.
 - c. Perfection Corporation; a subsidiary of American Meter Company.
 2. Body: PE.
 3. Ball: PE.
 4. Stem: Acetal.
 5. Seats and Seals: Nitrile.
 6. Ends: Plain or fusible to match piping.
 7. CWP Rating: 80 psig (552 kPa).
 8. Operating Temperature: Minus 20 to plus 140 deg F (Minus 29 to plus 60 deg C)
 9. Operator: Nut or flat head for key operation.
 10. Include plastic valve extension.
 11. Include tamperproof locking feature for valves where indicated on Drawings.
- K. Valve Boxes:
1. Cast-iron, two-section box.
 2. Top section with cover with "GAS" lettering.
 3. Bottom section with base to fit over valve and barrel a minimum of 5 inches (125 mm) in diameter.
 4. Adjustable cast-iron extensions of length required for depth of bury.
 5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

2.5 MOTORIZED GAS VALVES

- A. Automatic Gas Valves: Comply with ANSI Z21.21.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ASCO Power Technologies, LP; Division of Emerson.
 - b. Dungs, Karl, Inc.
 - c. Eaton Corporation; Controls Div.
 - d. Eclipse Combustion, Inc.
 - e. Honeywell International Inc.
 - f. Johnson Controls.
 - 2. Body: Brass or aluminum.
 - 3. Seats and Disc: Nitrile rubber.
 - 4. Springs and Valve Trim: Stainless steel.
 - 5. Normally closed.
 - 6. Visual position indicator.
 - 7. Electrical operator for actuation by appliance automatic shutoff device.

- B. Electrically Operated Valves: Comply with UL 429.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ASCO Power Technologies, LP; Division of Emerson.
 - b. Dungs, Karl, Inc.
 - c. Eclipse Combustion, Inc.
 - d. Goyen Valve Corp.; Tyco Environmental Systems.
 - e. Magnatrol Valve Corporation.
 - f. Parker Hannifin Corporation; Climate & Industrial Controls Group; Skinner Valve Div.
 - g. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
 - 2. Pilot operated.
 - 3. Body: Brass or aluminum.
 - 4. Seats and Disc: Nitrile rubber.
 - 5. Springs and Valve Trim: Stainless steel.
 - 6. 120-V ac, 60 Hz, Class B, continuous-duty molded coil, and replaceable.
 - 7. NEMA ICS 6, Type 4, coil enclosure.
 - 8. Normally closed.
 - 9. Visual position indicator.

2.6 PRESSURE REGULATORS

- A. General Requirements:
 - 1. Single stage and suitable for natural gas.
 - 2. Steel jacket and corrosion-resistant components.
 - 3. Elevation compensator.
 - 4. End Connections: Threaded for regulators NPS 2 (DN 50) and smaller; flanged for regulators NPS 2-1/2 (DN 65) and larger.

- B. Service Pressure Regulators: Comply with ANSI Z21.80.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Actaris.
 - b. American Meter Company.

- c. Fisher Control Valves and Regulators; Division of Emerson Process Management.
 - d. Invensys.
 - e. Richards Industries; Jordan Valve Div.
 - 2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
 - 3. Springs: Zinc-plated steel; interchangeable.
 - 4. Diaphragm Plate: Zinc-plated steel.
 - 5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
 - 6. Orifice: Aluminum; interchangeable.
 - 7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
 - 8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
 - 9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
 - 10. Overpressure Protection Device: Factory mounted on pressure regulator.
 - 11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
 - 12. Maximum Inlet Pressure: [100 psig (690 kPa)] <Insert pressure>.
- C. Line Pressure Regulators: Comply with ANSI Z21.80.
- 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Actaris.
 - b. American Meter Company.
 - c. Eclipse Combustion, Inc.
 - d. Fisher Control Valves and Regulators; Division of Emerson Process Management.
 - e. Invensys.
 - f. Maxitrol Company.
 - g. Richards Industries; Jordan Valve Div.
 - 2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
 - 3. Springs: Zinc-plated steel; interchangeable.
 - 4. Diaphragm Plate: Zinc-plated steel.
 - 5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
 - 6. Orifice: Aluminum; interchangeable.
 - 7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
 - 8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
 - 9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
 - 10. Overpressure Protection Device: Factory mounted on pressure regulator.
 - 11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
 - 12. Maximum Inlet Pressure: 2 psig (13.8 kPa).
- D. Appliance Pressure Regulators: Comply with ANSI Z21.18.
- 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Canadian Meter Company Inc.
 - b. Eaton Corporation; Controls Div.
 - c. Harper Wyman Co.
 - d. Maxitrol Company.
 - e. SCP, Inc.

2. Body and Diaphragm Case: Die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
9. Maximum Inlet Pressure: 2 psig (13.8 kPa)].

2.7 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Hart Industries International, Inc.
 - d. Jomar International Ltd.
 - e. Matco-Norca, Inc.
 - f. McDonald, A. Y. Mfg. Co.
 - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - h. Wilkins; a Zurn company.
 2. Description:
 - a. Standard: ASSE 1079.
 - b. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
 - c. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. Matco-Norca, Inc.
 - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - e. Wilkins; a Zurn company.
 2. Description:
 - a. Standard: ASSE 1079.
 - b. Factory-fabricated, bolted, companion-flange assembly.
 - c. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
 - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Insulating Kits:
 1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.

- d. Pipeline Seal and Insulator, Inc.
- 2. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: [150 psig (1035 kPa)] <Insert pressure>.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.

2.8 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section.
- B. Inspect natural gas piping according to the Fuel Gas Code to determine that natural gas utilization devices are turned off in piping section affected.
- C. Comply with the State and local Gas Code requirements for prevention of accidental ignition.

3.3 GENERAL

- A. Comply with local codes and gas utility company requirements.
- B. Install gas cocks and dirt legs at each piece of gas-fired equipment.
- C. Perform leak testing to satisfaction of local Fire Marshal, Building Inspector and utility company before enclosing piping, or allowing service to commence.
- D. All gas piping that is filled with gas shall be purged to the outside before any work is performed on the piping system as required by code.

3.4 ABOVE GROUND PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss,

expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

- B. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
 - C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
 - D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
 - E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
 - F. Locate valves for easy access.
 - G. Install natural gas piping at uniform grade of 2 percent down toward drip and sediment traps.
 - H. Install piping free of sags and bends.
 - I. Install fittings for changes in direction and branch connections.
 - J. Install escutcheons at penetrations of interior walls, ceilings, and floors.
 - K. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
 - L. Verify final equipment locations for roughing-in.
 - M. Comply with requirements in sections specifying gas-fired appliances and equipment for roughing-in requirements.
 - N. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- O. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
 - P. Conceal indoor pipe installations in walls, pipe spaces, utility spaces, above ceilings unless indicated to be exposed to view.
 - Q. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
 - R. Connect branch piping from top or side of horizontal piping.

- S. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required when flanged connections are provided.
- T. Do not use natural gas piping as grounding electrode.

3.5 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
- B. Install underground valves with valve boxes.
- C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- D. Install earthquake valves aboveground outside buildings according to listing.
- E. Install anode for metallic valves in underground PE piping.

3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

3.7 HANGER AND SUPPORT INSTALLATION

- A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 23 05 48.

- B. Comply with requirements for pipe hangers and supports specified in Division 23 05 29.
- C. Comply with hanger spacing per code.

3.8 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install natural gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 48 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

- A. Comply with requirements in Division 23 05 53 for piping and valve identification.
- B. Pipe Painting
 - 1. Prepare piping by removing mill slag and oil.
 - 2. Prime and paint piping with gas – yellow rust preventative painting system. 1 coat primer, 2 coats finish.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections: Test, inspect, and purge natural gas according to the latest adopted issue of NFPA 54, gas utility requirements, and as required by Authority Having Jurisdiction (AHJ).
- B. Natural gas piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports. Submit a copy to AHJ, Owner and Engineer.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain all specialty natural gas valves and trim.

3.12 PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN OR EQUAL TO 2.0 PSIG

- A. Aboveground, distribution piping shall be the following:
 - 1. Steel pipe with malleable iron fittings and threaded joints.

END OF SECTION 231123

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Aboveground Hydronic Pipe and Pipe Fittings
 - 1. Heating hot water supply and return
 - 2. Equipment drains
- B. Valves

1.2 RELATED WORK

- A. Section 23 05 00 – Common Work Results for HVAC
- B. Section 23 05 48- Vibration Isolation and Seismic Restraints
- C. Section 23 07 00 - Mechanical Insulation
- D. Section 23 21 14 - Hydronic Specialties

1.3 REFERENCES

- A. ANSI/ASME Section 9 - Welding and Brazing Qualifications
- B. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Classes 150 and 300
- C. ANSI/ASME B16.29 - Wrought Copper Fittings
- D. ANSI/AWS D1.1 - Structural Welding Code
- E. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated Welded and Seamless, for Ordinary Uses
- F. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses
- G. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
- H. ASTM B88 - Seamless Copper Water Tube
- I. ASTM D1785, D2467 - PVC Pipe and Fittings

1.4 QUALITY ASSURANCE

- A. All pipe shall be manufactured in the United States of America.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Conform to ANSI/ASME Section 9.

- D. Welders Certification: In accordance with ANSI/ASME Section 9.

1.5 SUBMITTALS

- A. Product data on all products and materials of this section shall be submitted in accordance with Special Conditions and Section 23 05 00.

PART 2 - PRODUCTS

2.1 ABOVEGROUND HEATING HOT WATER PIPING

- A. COPPER PIPE (Pipe Sizes 1-1/2 Inches and Smaller)
 - 1. Type M pipe: Shall not be used.
 - 2. Type L pipe shall conform to ASTM B-88, bear manufacturer's name and ASTM or ANSI grade on each length.
 - 3. Fittings: ASTM B16.22 wrought copper.
 - 4. Joints: ASTM B32, lead-free solder, grade 95TA.

- B. STEEL PIPE (Pipe Sizes 2 Inches and Larger)
 - 1. ASTM A53 or A120, Schedule 40, black, plain end.
 - 2. Fittings: ANSI/ASTM B16.3, malleable iron Class 150, or ASTM A234, forged steel Class 125.
 - 3. Joints: Screwed, or ANSI/AWS D1.1, welded.
 - 4. Mechanical Pipe Coupling System
 - a. Grooved pipe with mechanical couplings may be used with schedule 40 black steel pipe in systems where circulating water does not exceed 200° F. Do not use in anti-freeze protected water or steam systems.
 - b. Grooved pipe coupling system shall be manufactured by Victaulic or approved equal.
 - c. Couplings shall be self-centering and shall engage and lock in place the grooved or shouldered ends of pipe and pipe fittings in a positive watertight couplings. Couplings shall be designed to permit some angular pipe deflection, contraction, and expansion. Coupling clamp shall be ductile iron conforming to ASTM A536, Grade 65-45-12. Gasket shall be molded rubber conforming to ASTM D2000, the "line call-out" number shall be suitable for a water temperature of 230° F. Coupling nuts and bolts shall be steel conforming to ASTM A183. Fittings shall be grooved malleable iron conforming to ASTM A47, Grade 32510 or ductile iron conforming to ASTM A536, Grade 65-45-12 or malleable iron conforming to ASTM A47, Grade 32510. Mechanical couplings and fittings shall be of the same manufacturer. Before assembling couplings, coat pipe ends and outsides of gaskets with lubricant approved by the coupling manufacturer to facilitate installation.

2.2 JOINING MATERIALS

- A. Refer to individual specification sections for special joining materials not listed below.

- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

- C. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

- a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
- b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

- D. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

- E. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

- F. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

- G. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

- H. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

- I. Solvent Cements for Joining Plastic Piping:
 - 1. CPVC Piping: ASTM F 493.
 - 2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.3 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

- B. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.

- C. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

- B. Insulating Material: Suitable for system fluid, pressure, and temperature.

- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face or ring type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers. Separate companion flanges and steel bolts and nuts

shall have 150- or 300-psig minimum working pressure, where required to suit system pressures.

- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.5 FLANGES, UNIONS, AND COUPLINGS FOR STEEL PIPE

- A. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded piping.
- B. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges.
- C. Dielectric Connections: 2 Inch and Below - Union with galvanized or plate steel threaded end, copper solder end, or any other dissimilar pipe materials, water impervious isolation barrier. Over 2 Inch - Dielectric isolation flange.

2.6 ACCEPTABLE MANUFACTURERS – VALVES

- A. Milwaukee
- B. Stockham
- C. Nibco

2.7 GATE VALVES

- A. Up to 2 Inches: Bronze body, bronze trim, union bonnet, rising stem, handwheel, inside screw, solid wedge or disc, threaded ends. Minimum safe working pressure rating shall be 125 psig. Equal to Milwaukee 1151.
- B. Over 2 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, solid wedge, flanged ends. Minimum safe working pressure rating shall be 125 psig. Equal to Milwaukee F-2885-M.

2.8 GLOBE VALVES

- A. 2 Inch and Smaller: 150 LB Bronze body and trim, union bonnet, rising stem and handwheel, renewable Buna-N disc, threaded or sweat ends, gland packed, packable under pressure. Equal to Milwaukee 590S (threaded) or 1590S (sweat).
- B. 2-1/2 Inch and Greater: 125 LB Iron body, bronze trim, replaceable bronze disc, bolted bonnet, gland packed, flanged ends. Equal to Milwaukee F2981.

2.9 BALL VALVES

- A. Up to 1-1/2 Inches: Bronze one piece body, stainless steel ball and shaft, teflon seats and stuffing box ring, lever handle, solder or threaded ends. Class 125, minimum safe working pressure rating shall be 125 psig. Equal to Milwaukee BA-100-S (threaded) or BA-150-S (sweat).

2.10 SWING CHECK VALVES

- A. Up to 2 Inches: Bronze or iron body, 45 degree swing disc, screwed ends. Minimum gage working pressure rating shall be 125 psig. Equal to Milwaukee fig 508.
- B. Over 2 Inches: Iron body, bronze trim, 45 degree swing disc, renewable disc and seat, flanged ends. Minimum safe working pressure rating shall be 125 psig. Equal to Milwaukee F-2974-M.

2.11 DRAIN VALVES

- A. Equal to Milwaukee fig. BA-150-H (sweat) or Milwaukee fig. BA-100-H (threaded) with 3/4-inch hose connection.

2.12 BUTTERFLY VALVES

- A. 200 psi Iron body, stainless steel disc, minus 30 degrees F to 275 degrees F EPT replaceable liner, wafer or lug mounting. A 10-Position locking lever handle for 3" and under, worm gear drive for sizes greater than 3 inches. Equal to Milwaukee "M" series.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at the site. This does not relieve this Division from responsibility for proper erection of piping systems in every respect.
- B. All piping shall be run concealed throughout finished spaces either in furred spaces, shafts, chases, basements, under floor slabs or above ceilings. Piping buried below grade or below concrete slabs shall be run in PVC electrical conduit.
- C. Joints
 1. Joints above grade in copper pipe shall be soldered with 95/5 tin-antimony solder using non-corrosive flux. Joints in type K copper below grade shall not be permitted.
 2. Joints in steel pipe of all sizes may be made by welding or by flanges. Screwed joints may be made in steel pipe less than 4 inches in diameter. Screwed Joints shall be made with Teflon tape, Teflon liquid or other approved non-hardening joint compound applied to male threads only.
 3. Cut piping accurately for fabrication to measurements established at site and work into place without springing or forcing.
 4. Remove burr and cutting slag from pipes.
 5. Make changes in direction with proper fittings.
 6. Do not use reducing bushings, street elbows, or close nipples.
- D. Arrange piping not to interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings. Provide accessible, ground joint unions in piping at connections to equipment.
- E. Make provision for expansion and contraction of piping systems without placing undue strain on pipes, fittings, valves, and equipment. Piping shall be properly pitched and drain valves provided at low points to ensure ability to completely drain system. Manual air vents shall be

provided at high points of piping to allow complete air purging. These details are to be provided whether or not they are shown on the drawings.

- F. Provide standard steel or wrought iron sleeves wherever pipes pass through masonry walls or partitions. Provide sleeves at all locations where pipes pass through partitions or floors. Sleeves shall be sized two sizes over pipe size to facilitate proper firestopping.
- G. Make offsets, transitions, and changes in direction of pipes, ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on drawings. Furnish and install traps, air vents, sanitary vents, pull boxes, etc., as required to affect these offsets, transitions, and changes in direction.
- H. Provide clearance for installation of insulation and access to valves and fittings.
- I. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with surface finish to insure neat, clean appearance.
- J. Install valves with stems upright or horizontal, not inverted.
- K. Labeling: Label piping in accordance with specification section 23 05 53.

3.2 APPLICATION

- A. Use of non-metallic piping shall be limited to equipment gravity drains.
- B. Install dielectric unions or flanges where joining dissimilar materials.
- C. Install unions downstream of valves and at equipment or apparatus connections.
- D. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- E. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers. Ball valves may be used in sizes 1-1/4 inches and smaller.
- F. Install ball, globe, or butterfly valves for throttling, bypass, or manual flow control services.
- G. Provide 3/4 inch gate drain valves at main shut-off valves, low points of piping, bases of vertical risers, at equipment, and as otherwise indicated.
- H. Use butterfly valves in chilled water systems (but not hot water or glycol) interchangeably with gate and globe valves in pipe sizes 2-1/2 inch and larger. Do not use a butterfly valve to terminate piping dead ends unless a blank-off plate is also provided.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to, or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Finished Space:
 - 1) Bare Piping with Fitting or Sleeve Protruding from Wall: One piece, deep-pattern type with polished chrome-plated finish.
 - 2) Insulated Piping: One piece, stamped-steel type with spring clips with polished chrome-plated finish.
 - b. Unfinished Space:
 - 1) Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass type with rough brass finish.
 - 2) Insulated Piping: One piece, stamped-steel type with spring clips with polished rough brass finish.
- M. Sleeves are not required for core-drilled holes.
- N. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.
- O. Refer to equipment specifications in other sections of these Specifications for roughing-in requirements.

3.4 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Install dielectric coupling, nipple, unions, or flanges to connect piping materials of dissimilar metals.

3.6 FIELD QUALITY CONTROL

- A. All piping systems shall be hydrostatically tested to 3 times operating pressure or as required by the authority having jurisdiction (AHJ) and proven leak free prior to insulating. Leaking pipe, joints, or fittings shall be removed, replaced and retested. System components and equipment subject to damage from pressure testing shall be isolated by valves or removed prior to leak testing.

3.7 CLEANING

- A. All control valves shall be locked into a wide open position and all strainer baskets, with the exception of the air separator strainer, shall be removed during cleaning and flushing. Remove and clean air separator strainer after final flushing.
- B. Flush all piping with cold water to remove chips and scale, repeating this step until no trace of contamination is found.
- C. Next fill all heating piping with a 2 percent solution of trisodium phosphate and water, and bring to a temperature of 200 degrees F. To determine quantity of trisodium phosphate to be provided, Contractor shall determine volume of system by filling system through a meter (provided by Contractor).

- D. Circulate hot water through all piping and heating elements for 2 hours, then completely drain while still hot. Repeat this step until no sign of oil or sediment is found.
- E. Charge system with water and inhibitor solution. Coordinate with owner's water treatment contractor.

END OF SECTION 232113

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PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Expansion tanks.
- B. Air vents.
- C. Air separators.
- D. Strainers.
- E. Combination pump discharge valves (triple duty valves).
- F. Relief valves.
- G. Balance valves.
- H. Pump suction fittings.
- I. Filter Feeder

1.2 RELATED WORK

- A. Section 23 21 13 - Hydronic Piping.

1.3 REFERENCES

- A. ANSI/ASME - Boilers and Pressure Vessels Code.

1.4 REGULATORY REQUIREMENTS

- A. Conform to ANSI/ASME Boilers and Pressure Vessels Code Section 8D for manufacture of tanks.

1.5 QUALITY ASSURANCE

- A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

1.6 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Special Conditions and Section 23 05 00.
- B. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model, and dimensions.

- C. Submit manufacturer's installation instructions under provisions of Special Conditions and Section 23 05 00.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Special Conditions and Section 230500.
- B. Include installation instruction, assembly views, lubrication instructions, and replacement parts list.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - HYDRONIC SPECIALTIES

- A. Bell and Gossett
- B. Taco
- C. Armstrong

2.2 DIAPHRAGM-TYPE COMPRESSION TANKS

- A. Construction: Welded steel, tested and stamped in accordance with Section 8D of ANSI/ASME Code; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.
- B. Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 12 psig.

2.3 AIR VENTS

- A. Manual Type: Short vertical sections of 2 inch (50 mm) diameter pipe to form air chamber, with 1/8 inch (3 mm) brass needle valve at top of chamber.
- B. Float Type: Brass or semi-steel body, copper float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.

2.4 AIR SEPARATORS

- A. Combination Air Separators/Strainers: Steel, tested and stamped in accordance with Section 8D of ANSI/ASME Code, for 125 psig operating pressure, with stainless steel integral strainer with 3/16 inch perforations, tangential inlet and outlet connections, and internal stainless steel air collector tube.

2.5 STRAINERS

- A. Size 2 inch (50 mm) and Under: Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

- B. Size 2-1/2 inches to 4-inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- C. Size 5 inches and Larger: Flanged iron body for 175 psig working pressure, basket pattern with 1/8-inch stainless steel perforated screen.
- D. Equip all strainers with 1/2-inch ball valve and hose bib for blowdown.

2.6 COMBINATION PUMP DISCHARGE VALVES (TRIPLE DUTY VALVES)

- A. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psig operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

2.7 RELIEF VALVES

- A. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled. Provide capacity as scheduled, indicated or corresponding to the required relief valve capacity of the equipment served.

2.8 BALANCE VALVES (4 Inches and Smaller)

- A. Calibrated, balance valve with precision machined orifice, readout valves equipped with integral check valves and gasketed caps, calibrated nameplate and indicating pointer.

2.9 BALANCE VALVES (greater than 4")

- A. Balancing valves, where indicated in piping larger than 4 inches, shall consist of a combination of a butterfly valve for throttling and an orifice type flow meter. Where means of throttling already exists, such as combination valves at pump outlets, omit the butterfly valve.
- B. Cast iron, wafer type, orifice insert flow meter for 250 psig working pressure, with read-out valves equipped with integral check valves with gasketed caps.
- C. Portable meter consisting of case containing one, 3 percent accuracy pressure gage with 0 to 60 feet pressure range two, 3 percent accuracy pressure gages with 0-135 inches and 0-60 feet pressure ranges for 125 psig maximum working pressure, color coded hoses for low and high pressure connections, and connectors suitable for connection to read-out valves.

2.10 PUMP SUCTION FITTINGS

- A. Fitting: Angle pattern, cast-iron body, threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger, rated for 175 psig working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable fine mesh strainer to fit over cylinder strainer, and permanent magnet located in flow stream and removable for cleaning.
- B. Accessories: Adjustable foot support, blowdown tapping in bottom, gage tapping in side.

2.11 HIGH CAPACITY CHEMICAL FILTER FEEDER

- A. High capacity 2-gallon chemical Filter Feeder shall consist of continuous electric welded tube body, code semi-elliptical heads, sealed filter chamber and inlet neck riser, filter sock, filter support device, inlet/outlet/drain and fill port as manufactured by Wingert Co. Filter feeder will be installed as per manufacturers recommended installations and be supplied complete with valve package and noted accessories. Filter feeder is rated for 200 psi @ 200 DEG F.
- B. Shell: Body of bypass feeder shall be A513 tube and be a minimum of .104 thick for 6" diameter feeders and 0.134" for 10" diameter feeders.
- C. Heads: Tank heads shall be 2:1 semi-elliptical ASME code type SA-414G and a minimum of 0.134" thick for 6" diameter feeders and 0.134" thick for 10" diameter feeders.
- D. Style: Dome Bottom Feeder shall have side inlet and outlet 3/4" Phoenix #384 flange fittings, 3-1/2" 1/4 turn heavy duty cast closure, bottom drain 3/4" Phoenix #384 flange fitting and 3 (three) welded carbon steel legs.
- E. Filter Sock: Filter feeder shall be supplied with 25 micron napped polypropylene re-usable filter sock, with sewn in retaining ring and removal handle, stainless steel perforated filter basket with ring flange and stainless steel removal handle so that personnel shall not come in contact with vessel contents.
- F. Valve Packages: Shall be supplied complete with installation valve package as recommended by manufacturer. Valve package shall be complete with 3/4" brass inlet and outlet isolation valves, inlet and outlet union and drain valve with carbon steel street elbow and installation nipples.
- G. Feeder Size: Provide - gallon vessel, 10" diameter, height not to exceed 35 inches.
- H. Accessories: Feeder shall be supplied with the following accessory items to complete installation:
 - 1. Fill Funnel: 6" diameter carbon steel fill funnel with spill guard shall be supplied for filling of system chemicals.
 - 2. Sight Level 1/2" NPT, 12" OC sight level valves with automatic ball checks shall be supplied for filling of chemical feeder. Sight level gauge shall include two (2) sample valves with composite handles, automatic ball checks (in case of gauge glass breakage), Borasilicate gauge glass and gauge glass protection rods. Sight level gauge is rated 125 psi @ 200 DEG F.
 - 3. Air Release: 1/4" NPT lab cock style valve with relief discharge connection shall be supplied and installed in top dome to relieve trapped air that may cause system corrosion.
 - 4. Pressure Gauge: 1/4" NPT bottom tap gauge to indicate pressure at time of operation and servicing shall be supplied and installed in top dome, rated 0-300 psi.
 - 5. Sight Flow Indicator: Shall be furnished and installed on outlet side of feeder, to indicate flow through feeder, rated for 125 psi @ 200 DEG F.
 - 6. Flow Control: 3/4" NPT brass flow control valve with stainless steel internal shall be supplied and installed to insure flow rate and filter life.
 - 7. Warranty: Wingert Filter Feeders shall be guaranteed for one year from the date of shipment against manufacturing defects in material and workmanship which develop in

the service for which they are designed. Manufacturer shall repair or replace defective material.

PART 3 - EXECUTION

3.1 INSTALLATION AND APPLICATION

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- B. Support tanks inside building from building structure in accordance with manufacturer's instructions.
- C. Where large air quantities can accumulate, provide enlarged air collection standpipes.
- D. Provide manual air vents at system high points, and as indicated.
- E. For automatic air vents. Automatic air vents shall not be used above ceilings or other concealed locations.
- F. Provide air separator on suction side of system circulation pump and connect to expansion tank.
- G. Provide valved drain and hose connection on strainer blowdown connection.
- H. Provide combination pump discharge valve on discharge side of pump.
- I. Provide balancing valves on water outlet from terminal heating units.
- J. Provide relief valves on pressure tanks, low pressure side of reducing valves, heat exchangers, and expansion tanks.
- K. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity not to exceed rating of connected equipment.
- L. Where one line vents several relief valves, make cross-sectional area equal to sum of individual vent areas.
- M. Provide pump suction fitting on suction side of base mounted centrifugal pumps. Remove temporary strainers after cleaning systems.
- N. Support pump suction fittings with floor mounted pipe and flange supports.

END OF SECTION 232114

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Separately coupled, base-mounted, end-suction centrifugal pumps.

1.3 DEFINITIONS

- A. Buna-N: Nitrile rubber.
- B. EPT: Ethylene propylene terpolymer.
- C. HI: Hydronics Institute

1.4 SUBMITTALS

- A. Product Data: Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated. Indicate pump's operating point on curves.
- B. Shop Drawings: Show pump layout and connections. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain hydronic pumps through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of hydronic pumps and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- C. 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.
- D. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Manufacturer's Preparation for Shipping: Clean flanges and exposed machined metal surfaces and treat with anticorrosion compound after assembly and testing. Protect flanges, pipe openings, and nozzles with wooden flange covers or with screwed-in plugs.
- B. Store pumps in dry location.
- C. Retain protective covers for flanges and protective coatings during storage.
- D. Protect bearings and couplings against damage from sand, grit, and other foreign matter.
- E. Comply with pump manufacturer's written rigging instructions.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.8 WARRANTY

- A. Provide one 18 months warranty coverage for each pump as manufactured and delivered to the site, including labor and materials, from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

- A. Furnish on-site service and maintenance of pumps including parts and labor for 1 year starting at the date of Substantial Completion. Submit service contract for approval by Owner and Engineer.
 - 1. Ensure all pumps continue to function properly over the period.
 - 2. Check operation on site of all pumps at the end of one year of operation and again at two years.
 - 3. Respond to and repair failure or trouble on critical systems within 4 hours. This would include anything which could potentially cause significant occupant discomfort, property loss such as pipe freezing, or damage to equipment, or cause school not to open or close early.
 - 4. Failure to respond within time shall be grounds for Owner to engage another firm with costs paid by Contractor.
 - 5. Provide 1-800 or toll free access for tech support.
- B. Provide complete service of pump systems, including call backs. Make minimum of two complete normal inspections of approximately 4 hours duration, in addition to normal service calls to inspect, debug and repair as required for proper operation, and submit written reports.

1.10 EXTRA MATERIALS

- A. 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. Mechanical Seals: One mechanical seal(s) for each type/size of pump.

PART 2 - PRODUCTS

2.1 SEPARATELY COUPLED, BASE-MOUNTED, END-SUCTION CENTRIFUGAL PUMPS

- A. Manufacturers:
 - 1. Bell & Gossett; Div. of ITT Industries.
 - 2. Taco, Inc.
 - 3. Armstrong Pumps Inc.
- B. Description: Factory-assembled and -tested, centrifugal, overhung-impeller, separately coupled, end-suction pump as defined in HI 1.1-1.2 and HI 1.3; designed for base mounting, with pump and motor shafts horizontal. Rate pump for 175-psig minimum working pressure and a continuous water temperature of 225 deg F.
- C. Pump Construction:
 - 1. Casing: Radially split, cast iron, with replaceable bronze wear rings, threaded gage tappings at inlet and outlet, drain plug at bottom and air vent at top of volute, and flanged connections. Provide integral mount on volute to support the casing, and attached piping to allow removal and replacement of impeller without disconnecting piping or requiring the realignment of pump and motor shaft.
 - 2. Impeller: ASTM B 584, cast bronze; statically and dynamically balanced, keyed to shaft, and secured with a locking cap screw. Trim impeller to match specified performance.
 - 3. Pump Shaft: Stainless steel.
 - 4. Mechanical Seal: Carbon rotating ring against a ceramic seat held by a stainless-steel spring, and Buna-N bellows and gasket.
 - 5. Packing Seal: Stuffing box, with a minimum of four rings of graphite-impregnated braided yarn with bronze lantern ring between center two graphite rings, and bronze packing gland.
 - 6. Pump Bearings: Grease-lubricated ball bearings contained in cast-iron housing with grease fittings.
- D. Shaft Coupling: Molded rubber insert with interlocking spider capable of absorbing vibration.
- E. Coupling Guard: Dual rated; ANSI B15.1, Section 8; OSHA 1910.219 approved; steel; removable; attached to mounting frame.
- F. Mounting Frame: Welded-steel frame and cross members, factory fabricated from ASTM A 36/A 36M channels and angles. Fabricate to mount pump casing, coupling guard, and motor.
- G. Motor: Single speed, TEFC frame premium efficiency-motor duty with grease-lubricated ball bearings, unless otherwise indicated; secured to mounting frame, with adjustable alignment.

Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

- H. Capacities and Characteristics are scheduled and shown on the drawings.

2.2 PUMP SPECIALTY FITTINGS

- A. Suction Diffuser: Angle pattern, 175-psig pressure rating, cast-iron body and end cap, pump-inlet fitting; with bronze startup and bronze or stainless-steel permanent strainers; bronze or stainless-steel straightening vanes; drain plug with ball valve and hose bib and factory-fabricated support.
- B. Triple-Duty Valve: Angle or straight pattern, 175-psig pressure rating, cast-iron body, pump-discharge fitting; with drain plug and bronze-fitted shutoff, balancing, and check valve features. Brass gage ports with integral check valve, and orifice for flow measurement.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine equipment foundations and anchor bolt locations for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before pump installation.
- C. Examine foundations and inertia bases for suitable conditions where pumps are to be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CONCRETE BASES

- A. Install concrete bases of dimensions indicated for pumps and controllers. Refer to Division 23 Section "Common Work Results for HVAC."
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.3 PUMP INSTALLATION

- A. Comply with HI 1.4.

- B. Install pumps with access for periodic maintenance including removal of motors, impellers, couplings, and accessories.
- C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- D. Install continuous-thread hanger rods and spring hangers with vertical-limit stop of sufficient size to support pump weight. Vibration isolation devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Fabricate brackets or supports as required. Hanger and support materials are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- E. Set base-mounted pumps on concrete foundation. Disconnect coupling before setting. Do not reconnect couplings until alignment procedure is complete.
 - 1. Support pump baseplate on rectangular metal blocks and shims, or on metal wedges with small taper, at points near foundation bolts to provide a gap of 3/4 to 1-1/2 inches between pump base and foundation for grouting.
 - 2. Adjust metal supports or wedges until pump and driver shafts are level. Check coupling faces and suction and discharge flanges of pump to verify that they are level and plumb.

3.4 ALIGNMENT

- A. Align pump and motor shafts and piping connections after setting on foundation, grout has been set and foundation bolts have been tightened, and piping connections have been made.
- B. Comply with pump and coupling manufacturers' written instructions.
- C. Provide laser alignment & adjustment of pump and motor shafts for angular and offset alignment by methods specified in HI 1.1-1.5, "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation."
- D. Provide laser alignment & adjustment.
- E. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill baseplate with non-shrink, nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.

3.5 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.
- C. Connect piping to pumps. Install valves that are same size as piping connected to pumps.
- D. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.

- E. Install triple-duty valve on discharge side of pumps.
- F. Install suction diffuser and shutoff valve on suction side of pumps. (Base mounted pumps only)
- G. Install flexible connectors on suction and discharge sides of base-mounted pumps between pump casing and valves.
- H. Install pressure gages on pump suction and discharge, at integral pressure-gage tapping, or install single gage with multiple input selector valve.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain hydronic pumps. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 232123

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. This Section includes packaged, factory-fabricated and -assembled, gas-fired, water-tube boilers, trim, and accessories for generating hot water.

1.3 SUBMITTALS

- A. Shop Drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Design calculations and seismic restraint details, signed and sealed by a qualified professional engineer per Section 23 05 48 "Vibration and Seismic Controls for HVAC piping and equipment".
 - a. Design Calculations: Calculate requirements for selecting seismic restraints and for designing determination of housekeeping pad sizes.
 - b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.
 - 1. Performance at standard and IBR conditions.
 - 2. Minimum/maximum water flow rates.
 - 3. Input gas capacity and max/min inlet gas pressure.
 - 4. Minimum entering water temperature.
 - 5. Assembled unit dimensions.
 - 6. Weight and load distribution.
 - 7. Required clearances for maintenance and operation.
 - 8. Size and location of piping and wiring connections.
 - 9. Wiring Diagrams: For power, signal, and control wiring.
 - 10. Equipment Support Requirements.
 - 11. Piping roughing-in requirements.
 - 12. Vent & combustion air roughing-in requirements.
 - 13. Wiring roughing-in requirements, including spaces reserved for electrical equipment.
 - 14. Access requirements, including working clearances for mechanical controls and electrical equipment, and service clearances.
 - 15. Documentation of controls including any and all interface coordination items with building wide temperature control system.
- C. Operation and Maintenance Data: For each boiler to include in operation, and maintenance manuals.
- D. Warranty: Sample of warranty.

- E. Field quality-control test reports.
- F. Other Informational Submittals:
 - 1. ASME "A" Stamp Certification and Report: Submit "A" stamp certificate of authorization as required by authorities having jurisdiction, and document hydrostatic testing of piping external to boiler.
 - 2. Startup service reports.

1.4 QUALITY ASSURANCE

- A. 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.
- B. American Society of Mechanical Engineers (ASME) Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code. Provide boiler controls and safety devices in accordance with ASME CSD Section I.
- C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."
- D. DOE Compliance: Minimum efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."
- E. I=B=R Compliance: Boilers shall be tested and rated according to HI's "Rating Procedure for Heating Boilers" and "Testing Standard for Commercial Boilers," with I=B=R emblem on a nameplate affixed to boiler.
- F. UL Compliance: Test boilers for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

1.5 COORDINATION

- A. Coordinate size and location of concrete bases or supports with actual equipment provided. Cast anchor bolt inserts into bases. Concrete, reinforcement, and formwork requirements are the responsibility of this division.
- B. Coordinate boiler venting and outside air requirements with the requirements of Section 23 51 00 "Breechings, Chimneys and Stacks".
- C. Coordinate sizes and locations of equipment supports, and penetrations with actual equipment provided.
- D. Coordinate boiler controls and make accommodations required to facilitate interfacing with building wide temperature control system. Conduct temperature controls coordination meeting prior to preparation and submission of equipment product data to engineer.

1.6 WARRANTY

- A. Provide warranty for complete boiler unit starting from the date of substantial completion with the following terms:

1. Entire Unit: 18 months for complete boiler including defects in material and workmanship.
2. Heat exchanger warranty: ten years standard, twenty years for thermal shock.
3. Burner warranty: Five years standard.

1.7 MAINTENANCE

- A. Contractor to include service and maintenance of boilers by a factory-authorized service representative for period of one (1) year from Date of Substantial Completion.
- B. Ensure all boilers continue to function properly over the period.
- C. Respond to and repair failure or trouble on critical systems within 4 hours. This would include anything which could potentially cause significant occupant discomfort, property loss such as pipe freezing, or damage to equipment, or cause school not to open or close early.
 1. Failure to respond within time shall be grounds for Owner to engage another firm with costs paid by Contractor.
 2. Provide 1-800 or toll free access for tech support.
- D. Provide complete service of boilers, including call backs. Make minimum of two complete normal inspections of approximately 4 hours duration, in addition to normal service calls to inspect, debug and repair as required for proper operation, and submit written reports.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Store boilers with factory shipping packaging in a dry location protected from the outdoor elements including extreme heat and cold.
- B. Protect boilers from damage during transit, delivery, storage and during entire construction period.
- C. Installing contractor is responsible for any and all damage to equipment.
- D. Do not deliver equipment until interior building work is suitably complete and ready to accept the equipment without compromising any storage or protection requirements of this specification and the manufacturers warrantee.

PART 2 - PRODUCTS

2.1 CONDENSING BOILERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Camus - DynaMax (basis of design)
 2. Aerco – Esteem & Benchmark
 3. Westinghouse – Commercial Gas Boiler
- B. Factory Testing: Each boiler shall be completely factory assembled, packaged and fire-tested, requiring only connection to the water circulating system, fuel, electric utilities and flue gas vent. Factory fire-test results and complete operating and maintenance instructions are to be furnished with the unit. System safety and operating devices and controls shall be fully configured, calibrated and factory tested.

- C. The boiler shall meet the requirements of ANSI Z21.13, and CSA 4.9, and shall be vented as a Category II or IV condensing appliance.
- D. Combustion Chamber: The combustion chamber shall be all welded stainless steel construction which shall be sealed and completely enclosed, independent of the outer jacket and designed to drain condensation to the bottom of the heat exchanger assembly. A condensate collection box shall be employed to trap and neutralize flue product condensate. A window view port shall be provided for visual inspection of the boiler combustion during firing.
- E. Heat Exchanger: The stainless steel heat exchanger shall be inspected and tested to ASME Section IV requirements. The stainless steel heat exchanger shall be a counter-flow water tube design with multi-pass stainless steel all welded construction, with a maximum working pressure of 160 psig. The heat exchanger design shall be capable of 40 deg F constant system return temperatures to enable fully condensing operation. A pressure relief valve shall be furnished with the boiler.
- F. Controls: Standard controls include a SOLA electronic proportional integrated combination ignition limit/operator control accurate to 1° F having a pulse width modulation signal output for modulating fan speeds. Controls shall be lead/lag "Cascade" ready for control of up to eight boilers and shall include outdoor temperature reset. Control is BMS Modbus RTU protocol ready and capable of other alternate protocol conversions with additional optional gateway protocol converter. Control shall be supplied with a mounted multi-line user-configurable display which shall provide for control system configuration and set up, readouts of boiler target, differential and inlet/outlet temperatures as well as accumulated runtime, enunciator diagnostics, and firing rates. The display shall be accessed through a 5-way touchpad high resolution LCD control with shortcut key access with user and installer protected parameters. The boiler safety control string shall be furnished with controls for optional low gas pressure, optional high gas pressure, blocked flue, high limit, stack limit and flow switch. A current transformer shall be supplied with all wall hung models to perform flow switch functionality. A flow switch shall be provided loose on floor-mount models. Additional control safeties shall include flame rectification, fan speed, and high limit.
- G. Burner: The burner shall be a premix design and constructed of high temperature stainless steel with metal fiber outer covering to provide modulating firing rates. The burner shall provide equal distribution of heat through the entire heat exchanger. Combustion shall operate with a 5:1 turn down ratio while sustaining efficient combustion characteristics throughout the entire modulating range.
- H. Boiler shall be provided with factory-mounted integral pump.
- I. Venting and Air Intake Options: Boiler shall be installed and connected to an approved horizontal, through-wall, AL29-4C stainless steel venting system and components for draining condensate. Boiler shall be designed to operate under sealed combustion characteristics. Integral fan shall provide the means for pulling air and products of combustion across the heat exchanger, through the boiler flues and exhausting the flue gases into the vent system. Where supported by the manufacturer, a concentric exhaust venting – combustion air intake may be used. PVC shall not be used for boiler venting and air intake.
- J. Gas Train: Provide CSD-1 gas train consisting of a pressure regulating electro-hydraulic proportional air/gas main gas actuator providing a slow opening, fast closing automatic safety shutoff valve and gas pressure regulator, with a low gas pressure switch and a high gas pressure switch. Boiler shall be capable of operating with an inlet Natural Gas pressures between 3" and 14"WC and deliver heat capacities as scheduled.

- K. External Jacket and Fasteners: The external jacket shall be of 430 stainless steel mirror finish and powder coated steel panels assembled utilizing interference fit locks and minimal non-strip self tap screws for ease of removal and access to the heat exchanger and combustion air/gas control.

2.2 PRIMARY PUMP

- A.

2.3 CONDENSATE NEUTRALIZING UNITS

- A. When available contractor shall provide factory condensate neutralization kit (furnished and installed by boiler manufacturer) for each boiler. Where not installed in boiler, Contractor shall install in accordance with manufacturer's recommendations and code.
- B. If not available from equipment manufacturer contractor shall provide condensate neutralization units as separate units meeting code requirements. Provide condensate neutralization units for each boiler drain and all drains serving breeching, chimneys and stacks.
- C. The condensate tubes shall be designed to raise the PH level 10–1,000 times more towards the neutral point of the PH being discharged by the boiler or furnace and be pre-filled with media such as limestone.
- D. Contractor-provided neutralizer tube or tubes shall be as manufactured by JMM Boiler Works and sized as indicated below:

Model No.	MBH (input)	GPH	Dia. (in)
JM-2	200	2	2-3/4
JM-6	600	6	4
JM-10	1,000	10	4
JM-20	2,000	20	5
JM-30	3,000	30	5
JM-40	4,000	40	7-3/16
JM-50	5,000	50	7-3/16

- E. The installing contractor shall supply all boilers/furnaces and vent condensate drains with "P-traps" and unions before the neutralizing tubes.
- F. All piping for the first 2 ft from boiler or stack drain including "P-Trap" shall be stainless steel tube thereafter drain piping may be PVC. Plastic tubing is not an acceptable alternative and shall not be used at all.
- G. The boiler and flue condensate drains shall not be combined into one neutralizer. All piping shall be per manufacturer's piping diagrams and directions. All neutralizing tubes shall be secured to

the floor or wall so as not to be exposed to damage or within a normal walkway. The contractor shall fill all "P-traps" and neutralizing tubes with tap water before the firing of any boiler.

- H. The contractor shall inform the owner of any maintenance or scheduled recharge of the tube's limestone aggregate as described in the manufacturer's manual.

2.4 SOURCE QUALITY CONTROL

- A. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.
- B. Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency.
- C. Burner and Hydrostatic Test: Factory shall perform hydrostatic test of boiler prior to shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before boiler installation, examine roughing-in for boiler supports, anchor bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
 - 1. Final boiler locations indicated on drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.
- B. Examine mechanical spaces for suitable conditions where boilers will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BOILER INSTALLATION

- A. Install boilers level using factory support frame or base.
- B. Provide seismic snubber angles and housekeeping pad for floor mounted boilers.
- C. Provide rubber bushings and seismic anchors for wall mounted boilers.
- D. Install gas-fired boilers according to state and local codes.
- E. Assemble and install all boiler trim, piping, controls furnished by boiler manufacturer.
- F. Install electrical devices and controls furnished with boiler, but not specified to be factory mounted, including field wiring.
- G. Follow boiler manufacturer's installation requirements including, but not limited to, the following:
 - 1. Flush the system with clean water.
 - 2. Isolate the boiler, fill the system with fresh water and a boiler cleaner, and run for 30 minutes to 1 hour. Under no circumstances may boiler cleaner be pumped through the boiler. Use only products approved by boiler manufacturer.

3. Thoroughly flush the system with fresh water. Ensure all zones and loops are flushed. Empty out sediment traps.
 4. Fill the system with fresh water and the proper amount of inhibitor.
 5. Verify the pH is within the proper range as recommended by the boiler manufacturer.
 6. Add additional inhibitor if pH is not within the proper range.
 7. Contractor shall notify Owner to check pH annually as part of demonstration. Contractor shall include this in O&M manuals also.
 8. Use untreated water only to fill the system.
 9. Never introduce non-approved boiler treatment or similar additives.
- H. Flow Rate: Do not exceed the maximum permissible flow rate through the boiler. Excessive flow can cause erosion damage to the heat exchanger.
- I. Dielectric Isolation: Install Dielectric Unions at the boiler supply line and return nearest the boiler or the low loss header.
- J. Cleaning Requirements: Before connecting the boiler to a new or existing heating system, clean and flush the system thoroughly. Ensure the system is free of sediment, flux and any residual boiler water additives.
- K. Do not mix different manufacturer's products of cleaners or inhibitors. Consult boiler manufacturer's representative for recommendations.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to boiler to allow service and maintenance.
- C. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.
- D. Connect hot-water piping to supply- and return-boiler tappings with shutoff valve and union or flange at each connection.
- E. Install piping from safety relief valves to 12" above floor.
- F. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.
- G. Connect breeching to full size of boiler outlet. Comply with requirements of specifications, boiler manufacturer and breeching manufacturer requirements.
- H. Power wiring shall be by Division 26.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports. Installing Contractor shall provide the services of a factory-trained service representative to provide the factory startup, initial boiler lightoff and one (1) year of follow-up service. This requirement shall not be waived, nor shall the responsibility for the Service Contract be assumed by any other party.

- B. Engage a factory-authorized service representative to conduct factory start-up, inspect component assemblies and equipment installations, including connections, and to conduct performance testing.
- C. Boilers shall comply with performance requirements indicated, as determined by field performance tests. Adjust, modify, or replace equipment in order to comply. Provide analysis equipment required to determine performance.
- D. Provide temporary equipment and system modifications necessary to dissipate the heat produced during tests if building systems are not adequate.
- E. Document test results in a report and submit to Engineer and Owner for review and comment.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain boilers.

END OF SECTION 235216

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 types of air coils that are not an integral part of air-handling units:
 - 1. Hot-water.
- B. Related Sections include the following:
 - 1. Division 15 Sections for air coils that are integral to air-handling units.

1.3 SUBMITTALS

- A. Product Data: For each coil indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each air coil. Include rated capacity and air side and liquid pressure drop for each air coil.
- B. Shop Drawings: Coil fabrication and casing drawings, drain pans, manifolds fittings, including interface to coils section in AHU or ducts where coils will be installed.
- C. Coordination Drawings: Coil section support drawings
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For air coils to include in operation and maintenance manuals.

1.4 PROJECT CONDITIONS

- A. Hot water coils will new additions (not replacements). The intent is to install them in the lower mixing box of the air handler.
- B. Allowable down time for the air handlers will be restricted to periods as short as 2 hours, depending on the zones served. This will require temporary measures including blank duct "spool pieces" to re-connect zone ducts to AHUs in order to re-establish ventilation air flow at the end of a shut-down period.
- C. Do not submit data for or order coils until pre-construction balancing results are available and have been evaluated by the Engineer.
- D. The space constraints require that detailed field measurements be made by the contractor of the available space and duct interfaces for the coils.

PART 2 - PRODUCTS

2.1 HOT WATER COILS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Trane
 - 2. Condensing unit manufacturer (if they comply with requirements)
 - 3. USA Coil and Air
 - 4. Heatcraft

2.2 HOT WATER COILS

- A. Performance Ratings: Tested and rated according to ARI 410 and ASHRAE 33.
- B. Minimum Working-Pressure/Temperature Ratings: 160 psig, 250 F.
- C. Source Quality Control: Factory tested to 300 psig
- D. Tubes: ASTM B 743 copper, 5/8" diameter minimum 0.035 wall thickness.
- E. Rows – as required to provide scheduled output.
- F. Fins: Aluminum 0.010 inch thick – plate type.
- G. Headers: Seamless copper tube with brazed joints
- H. Frames: Galvanized-steel channel frame, minimum 16 ga. for flanged or "duct mate" mounting.
- I. Casing: Hot water and DX cooling coil may be mounted in a common casing if doing this facilitates the installation of the coils. Provide for flanged or "duct mate" connection to AHU and ducts.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine ducts, plenums, and casings to receive air coils for compliance with requirements for installation tolerances and other conditions affecting coil performance. Record dimensions of available space for each coil. Do not finalize coil submittals or order coils until results of pre-construction balancing measurements have been reviewed by Contractor and Engineer. The coil dimensions shown on the drawing coil schedule must be either verified or changed slightly to accommodate field conditions.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before coil installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install coils level and plumb.
- B. Install coils in metal ducts and casings constructed according to SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."
- C. Install stainless-steel drain pan under each coil.
 - 1. Construct drain pans according to ASHRAE 62.
 - 2. Construct drain pans to extend beyond coil length and width and to connect to condensate trap and drainage.
 - 3. Extend drain pan upstream and downstream from coil face.
 - 4. Extend drain pan under coil headers, exposed supply piping if these are within coil casing and extend under hot water coil if in a common casing.
- D. Straighten bent fins on air coils.
- E. Clean coils using materials and methods recommended in writing by manufacturers, and clean inside of casings and enclosures to remove dust and debris.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to coils to allow service and maintenance.
- C. Connect water piping with unions and shutoff valves to allow coils to be disconnected without draining piping. Control valves are specified in Division 15 Section "HVAC Instrumentation and Controls," and other piping specialties are specified in Division 15 Section "Hydronic Piping."

3.4 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:

END OF SECTION 238216

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Provide basic electrical system components including raceway, wire and cable, pull and junction boxes, outlet boxes, wiring devices, motor starters, disconnect switches, overcurrent protective devices, electrical equipment not furnished as an integral part of manufactured equipment, and all incidental devices and accessories necessary for a complete and operational system as indicated on the Drawings and as specified.

1.3 PERMITS AND FEES

- A. Provide all necessary notices, obtain all permits, file all required plans, obtain all necessary approvals of governmental departments and utilities having jurisdiction over the electrical work and obtain all required certificates and inspections.

1.4 CODES, REGULATIONS AND STANDARDS

- A. All materials, equipment, apparatus and work shall be in accordance with the 2011 edition of The National Electrical Code, State and Local codes, and requirements of local utility companies.
- B. Electrical equipment and materials shall be approved by the Underwriters' Laboratories, Inc. or other national, well known testing laboratory as evidenced by listing or labeling.
 - 1. All equipment items or parts thereof shall bear the manufacturer's nameplate, which shall give all pertinent information for the particular item.
 - a. Distributor's or contractor's nameplates will not be acceptable.
- C. Discrepancies. Provide the more stringent requirement in case of discrepancies among the Contract Documents, Code requirements and industry standards. Also, include item or arrangement of better quality, greater quantity or higher cost in Contract price.
 - 1. Notify Engineer in writing of identified discrepancies.
- D. Design Drawings: Drawings are diagrammatic in nature. Locations of electrical equipment and accessories are not intended to show every offset and fitting, nor every structural difficulty that may be encountered during the installation of the Work.
 - 1. Where necessary and after approval from the Engineer, revise alignment of work and equipment from that shown on Drawings without additional cost to the Owner.
 - a. Identify revised locations on Record Drawings.

1.5 DEFINITIONS

- A. The following terms are used in this Division and are defined as follows:
1. "Provide": To furnish and install, ready for safe and regular operation the item, material or service under discussion.
 2. "Furnish": To purchase, acquire and deliver to the site, complete with related accessories.
 3. "Install": To erect, mount and connect completely, by acceptable methods.
 4. "Concealed": Embedded in masonry or other construction; or installed in furred spaces, trenches or crawl spaces; or installed within double partitions or hung ceilings; or in enclosures.
 5. "Exposed": Visible to building occupants, excluding mechanical room and utility tunnel locations.
 6. "Equal": Of weight, size, design, capacity and efficiency to meet requirements specified and shown, and of acceptable manufacture, as determined in the opinion of the Engineer.
 7. "Acceptable": Acceptable, as determined in the opinion of the Engineer.
 8. "Named" Product: Manufacturer's name for product, as recorded in published documents of latest issue as of date of Contract Documents. Obtain Engineer's permission before using products of later or earlier model.

1.6 SUBMITTALS - GENERAL

- A. Identify the following:
1. Accessories and special/non-standard features and materials to be provided.
 2. List of accessories which are required for a proper installation but are NOT part of the submittal.
 - a. In the latter case, identify the Section(s) under which the accessories are being provided.
- B. Format: Include the following information on each submittal. Failure to comply will result in submittal rejection.
1. Specification Section and Paragraph under which equipment is specified.
 2. Equipment or fixture identification corresponding to that used in Contract Documents.
 3. Descriptive data necessary to verify compliance with Contract Documents.
- C. Operation and Maintenance Manuals Format
1. Arrange manuals in the following format:
 - a. Tab A - Description of Electrical System and Component Parts, including function, normal operating characteristics and limiting conditions, performance curves, engineering data and tests, and complete nomenclature and manufacturer's number for replaceable parts.
 - b. Tab B - Operating Procedures, including start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown and emergency instructions; summer and winter operating instructions; and any special operating instructions.
 - c. Tab C - Sequence of Operation and Control Diagrams, corrected to show as-built conditions.
 - d. Tab D - Copies of approved shop drawings, charts and diagrams.

- e. Tab E - Maintenance Procedures, including routine operations, guide to trouble-shooting; disassembly, repair and reassembly; alignment, adjusting and checking; servicing and lubrication schedule, and list of lubricants; manufacturer's installation and maintenance bulletins and related information.
 - f. Tab F - Parts List, including illustrations, assembly drawings and diagrams required for maintenance, predicted life of parts subject to wear, and recommendations for stocking spare parts.
 - g. Tab G - Names, addresses and telephone numbers of manufacturer's representative and Service Company.
 - h. Tab H - Other data, if required under pertinent Sections of these Specifications.
- D. Review Process: Upon completion of submittal review, Action Submittals will be returned, marked with one of following notations: Furnish as Submitted, Furnish as Corrected, Revise and Resubmit, Rejected, or Submit Specified Item.
- 1. Provide only materials and products noted as "Furnish as Submitted" or "Furnish as Corrected".

1.7 INFORMATIONAL SUBMITTALS

- A. List of Proposed Manufacturers: Submit prior to product and shop drawing submittals.
- B. Copies of notification letters, permits, certificates, and inspection reports.
- C. Manufacturers Guarantee: Furnish standard manufacturers' guarantees for work. Such guarantees shall be in addition to, and not in lieu of, other liabilities under the law or by other provisions of the Contract Documents.

1.8 ACTION SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's specifications including materials of construction, metal gage, thickness and finish.
 - 2. Performance data, ratings, operating characteristics and operating limits.
 - 3. Electrical ratings and characteristics.
 - 4. Certifications requested, including UL label or listing.
- B. Certification: Certify that system elements are of sufficient capacity to meet the specified performance requirements as set forth in Contract Documents.
- C. Shop Drawings
 - 1. Certified dimensional drawings including clearances required for maintenance or access.
 - 2. Wiring and control diagrams, where applicable.
- D. The selection and intention to use a product specified by name shall NOT excuse the need for timely submission of shop drawings for that product.
- E. Submission of shop drawings of unnamed manufacture or shop drawings at variance with the Contract Documents is NOT a proper request for substitution.

- F. Samples
 - 1. Submit samples as requested by Engineer/Owner.
 - 2. Clearly identify samples that are submitted in lieu of shop drawings. Submit a minimum of two samples.
 - a. Only one sample will be returned. Keep the accepted sample at the job site office.

1.9 CLOSEOUT SUBMITTALS

- A. Record Drawings
 - 1. Maintain and keep on site at all times, one complete set of blackline prints for Electrical and Communication work. Promptly and accurately record changes, revisions and additions in a clear and neat format.
 - 2. Indicate daily progress on Record Drawings by coloring in the various lines, fixtures, apparatus and associated appurtenances as they are erected.
 - 3. Approval of requisition for payment of work installed will NOT be given unless supported by the Record Drawings.
 - 4. At the conclusion of work, deliver Record Drawings to Owner.
- B. Operation and Maintenance Manuals
 - 1. Submit Operation and Maintenance manuals for each system or piece of equipment, at least 4 weeks prior to request for acceptance of same. Upon acceptance, furnish four copies of each manual to Engineer for transmittal to Owner.
- C. Video of Equipment Instruction Procedures. Pertaining to the operation or programming of equipment. Submit to Owner.
- D. Letter of Guarantee.
- E. Extended equipment warranty.

1.10 QUALITY ASSURANCE

- A. Only the best of workmanship in accordance with present standards and generally accepted construction practices will be acceptable. Any work which the workmanship is judged by the Engineer to be below the present standards or generally accepted construction practices shall be replaced with properly done work at the Contractor's expense.

1.11 WARRANTY

- A. Warranty materials, equipment and labor against defects for a period of eighteen months from date of Substantial Completion. Repair or replace areas, materials and other systems damaged as a result of defects.
 - 1. Replace defective items (requiring excessive servicing) during warranty period at no additional cost to the Owner.
 - 2. Provide maintenance and emergency service including labor and materials during the warranty period at no additional cost to Owner. Perform service and replace affected components within reasonable time period.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials for the Work are specified in the appropriate Specification Sections and may also be specified on the Drawings.

2.2 PRODUCT SELECTION

- A. Contractor's options for selecting products are limited by Contract Document requirements and governing regulations and are NOT controlled by industry traditions or procedures experienced by Contractor on previous construction projects. Required procedures include, but are NOT necessarily limited to, following various methods of specifying:
 - 1. "Or Equal": Where named products are accompanied by the term "or equal" or words of similar effect, provide one of named products or propose substitute product according to "SUBSTITUTIONS" Article.
 - 2. Standards, Codes and Regulations: Where specification requires only compliance with a standard, code or regulation, Contractor may select any product which complies with requirements of that standard, code or regulation.
 - 3. Performance Requirements: Provide products which comply with specific performances indicated and which are recommended by manufacturer (in published product literature or by individual certification) for application intended. Overall performance of product is implied where product is specified with only certain specific performance requirements.
- B. Inclusion by name, of more than one manufacturer or fabricator, does NOT necessarily imply acceptability of standard products of those named. All manufacturers, named or proposed, shall conform, with modification as necessary, to criteria established by Contract Documents for performance, efficiency, materials and special accessories.

2.3 SUBSTITUTIONS

- A. See Specification Section 01 25 00, "Substitution Procedures".

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install work as close as possible to layouts shown on Contract Drawings. Modify work as necessary to:
 - 1. Provide maximum possible headroom and space clearances.
 - 2. Provide ready access to all parts of the work, for inspection, operation, safe maintenance and repair, and code conformance.
 - 3. Coordinate and arrange work to avoid conflicts with work of other trades. Satisfactory space conditions shall be shown on coordination drawing submittals.
- B. Where space appears inadequate, consult Engineer before proceeding with installation.
- C. Finished work shall present a neat coordinated appearance.

3.2 INSPECTION OF WORK

- A. Do not cover or enclose work until it has been inspected, tested, and approved by the Owner's Representative and by authorities having jurisdiction.
- B. When requested, uncover and expose work that has not been completely inspected, tested and approved. Repair and restore surfaces and enclosures at no additional cost to Owner.

3.3 FIELD QUALITY CONTROL

- A. Instruct the Owner or the Owner's Representative in the operation, adjustment, and maintenance of electrical equipment. The procedures of any instructions pertaining to the operation and/or programming of equipment shall be video taped and two copies turned over to the Owner.
- B. Obtain services of manufacturer's representatives of major equipment during erection or construction of their respective equipment to insure proper installation of same. Failure to have such checks made by manufacturers shall place full responsibility for proper installation on contractor who shall make any corrections or remedy all defects at no additional cost to Owner. If required by the Engineer, a letter shall be provided from each manufacturer certifying that manufacturer's requirements are met.
- C. Test and adjust each system and equipment for which he is responsible during the progress of the work, as required by the Engineer, and shall thoroughly test the same under working conditions at the completion of the work.
- D. Coordinate activities related to the electrical work.

3.4 CLEANING

- A. Remove debris at the close of each workday from work areas and adjacent occupied areas. Maintain adjacent areas in a safe and useable condition.

END OF SECTION 260505

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. Selective demolition and removal of existing electrical equipment, hardware and system components including:
 - a. Raceway.
 - b. Wire/cable.
 - c. Disconnect Switches.
 - d. J-Boxes.
 - e. Outlet Boxes.
 - f. Light switches
- B. Related Requirements:
 - 1. Division 01 Section "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing system and legally dispose of them off-site.
- B. Existing to Remain: Existing items of system that are not to be permanently removed and that are not otherwise indicated to be removed.

1.4 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations.

1.5 CLOSEOUT SUBMITTALS

- A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- B. Recycling Records: Indicate receipt and acceptance of material by a recycling facility licensed to accept fluorescent light tubes.

1.6 FIELD CONDITIONS

- A. Owner will occupy the building during electrical demolition. Conduct selective electrical demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective electrical demolition.
- D. Hazardous Materials: Hazardous materials are present in portions of electrical system to be selectively demolished. Known hazardous materials are listed in the SUMMARY Article. Inspect work areas for mercury and other hazardous material sources.
 - 1. Notify workmen of the importance of proper handling of fluorescent light tubes and PCB ballasts.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective electrical demolition operations.
 - 1. Maintain fire-protection facilities in service during selective electrical demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective electrical demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

2.2 MATERIALS AND EQUIPMENT

- A. All materials and equipment necessary for patching.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- B. Survey and inspect existing conditions and correlate with requirements indicated to determine extent of selective electrical demolition required.
 - 1. Confirm noted field measurements identified on Drawings.
 - 2. Field verify that feeders and branch circuits to be removed do not service equipment to remain in place.

- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs and preconstruction videotapes.
 - 1. Comply with requirements specified in Division 01 Section "Photographic Documentation."
- E. Proceeding with selective electrical demolition indicates acceptance of existing conditions.

3.2 PREPARATION

- A. Prevent PCB containing fluorescent light ballasts and mercury vapor in fluorescent light tubes from being disposed of as general waste.
 - 1. Costs associated with separating the above mentioned hazardous materials, including fines for illegal transport or disposal, are part of the Contract.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

3.3 ELECTRICAL SYSTEMS

- A. Existing Systems to Remain: Maintain systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing systems interruptions specified in Division 01 Section "Summary."
- B. Existing Systems to Be Removed or Abandoned: Locate, identify, disconnect, and seal or cap off indicated electrical systems and portions of electrical systems to be selectively demolished.
 - 1. Owner will arrange to shut off indicated systems when requested by Contractor.
 - 2. Arrange to shut off indicated utilities with utility companies.
 - 3. Relocate, extend existing circuits, or provide temporary electrical system as required to maintain continuity of system to other parts of building and to support electrical devices and equipment to remain.
 - 4. When the building is occupied, limit power shutdowns to short time spans and small areas.

- a. Coordinate with and inform occupants a minimum of 48 hours in advance of scheduled shut downs.
 - b. Obtain approval of Owner and Engineer prior to system shut downs.
5. Disconnect electrical systems in areas where equipment is indicated to be removed.

3.4 SELECTIVE ELECTRICAL DEMOLITION, GENERAL

- A. General: Demolish and remove existing systems only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 4. Maintain adequate ventilation when using cutting torches.
 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

3.5 SELECTIVE ELECTRICAL DEMOLITION PROCEDURES

- A. Demolish existing electrical systems and accessories as required for completion of the Work.
- B. Remove or relocate existing installations to accommodate new construction.
- C. Disconnect and Remove
1. Circuits: Remove wiring to last active device.
 2. Exposed Conduit: Remove conduit and attachments including conduit above accessible ceiling finishes.
 3. Outlets: Remove if conduit servicing outlet is to be removed.
 4. Panelboards and Distribution Equipment.
 5. Electrical Devices and Equipment.
 6. Items as required for the completion of the Work.
- D. Abandon
1. Outlets: If conduit servicing outlet is abandoned in place, provide blank cover over outlet.
 2. Conduit: Cut abandoned conduit flush with walls and floors and patch surfaces to match existing surface condition or better.
- E. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

- A. Clean adjacent surfaces of dust, dirt, and debris caused by selective electrical demolition operations. Return adjacent areas to condition existing before selective electrical demolition operations began.
- B. Remove demolition debris from work areas at the close of each workday. Keep areas adjacent to work areas in safe and useable condition.
- C. Clean existing equipment to remain or be reused and leave in an operational condition.
- D. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION 260506

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. 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:
 - 1. American Insulated Wire Corp.; a Leviton Company.
 - 2. General Cable Corporation.
 - 3. Senator Wire & Cable Company.

4. Southwire Company.
 5. Approved Manufacturer
- B. Copper Conductors: Comply with NEMA WC 70. Minimum size for power and lighting shall be No. 12. Minimum size for low voltage control shall be No. 16.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

2.2 CONNECTORS AND SPLICES

- A. 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:
1. AFC Cable Systems, Inc.
 2. Hubbell Power Systems, Inc.
 3. O-Z/Gedney; EGS Electrical Group LLC.
 4. 3M; Electrical Products Division.
 5. Tyco Electronics Corp.
 6. Approved Manufacturer
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Branch circuit conductors within lighting fixtures shall have minimum 90 degrees C. rating approved for fixture wiring.
- B. Final connections to equipment shall be made with copper insulated conductors installed in liquid tight flexible raceway. Minimum size ¾".
- C. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

- D. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- E. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- F. There shall be no splices in any conductors except where circuits are branched and located in accessible junction or outlet box.
- G. Unless otherwise noted, each conduit raceway shall contain only those conductors constituting a single feeder circuit.
- H. Branch circuit home runs shall not share a common neutral. Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
- I. All feeder and branch circuits shall have a full size separate grounding conductor installed in the conduit.

3.3 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. All connections and pigtail splices for wires #14-#10 shall be made with insulated type "Y", "R", or "B" spring connectors or compression splices. Conductor sizes #8 and larger shall be made with compression connectors.
- D. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- E. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- F. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

END OF SECTION 260519

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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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Custom enclosures and cabinets.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Structural members in the paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

1.5 QUALITY ASSURANCE

- A. 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.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. 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:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. Electri-Flex Co.
 - 6. Manhattan/CDT/Cole-Flex.
 - 7. Maverick Tube Corporation.
 - 8. O-Z Gedney; a unit of General Signal.
 - 9. Wheatland Tube Company.
 - 10. Approved Equal
- B. IMC: ANSI C80.6.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel or aluminum.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel, set-screw type.
- G. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.
- H. IMC conduit shall be assembled with threaded connections, double lock nuts and bushings at conduit terminations, standard radius bends. When conduit is exposed, "L" fittings may be used.

2.2 METAL WIREWAYS

- A. 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:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman.
 - 3. Square D; Schneider Electric.
 - 4. Approved Equal
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type.
- E. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. 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:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company.
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell Company.
 - 8. Robroy Industries, Inc.; Enclosure Division.
 - 9. Spring City Electrical Manufacturing Company.
 - 10. Thomas & Betts Corporation.
 - 11. Approved Equal
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

- G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. See wiring methods indicated on drawings for raceway applications.
- B. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
- D. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION OF RACEWAYS

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 12 inches (300 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Arrange conduit to maintain headroom and present a neat appearance.
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Conceal raceway within finished walls, ceilings, and floors, unless otherwise indicated.
- G. Exposed conduit and conduit above accessible ceilings shall be run parallel with or at right angles to the walls of the building and adjacent piping.
- H. All metal conduit, enclosures and raceways for conductors shall be mechanically joined together to form a continuous electrical continuity and bond. Provide grounding bushings on all conduits 1-1/4 inches and larger.
- I. Conduits shall be in full lengths wherever possible and all ends shall be cut square, reamed and burred.
- J. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- K. Use conduit bodies to make sharp changes in direction.
- L. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inches in size.

- M. Where conduit is concealed in block walls, install the conduit as the wall is being erected. Chasing of the walls is prohibited.
- N. The use of wooden plugs inserted in concrete or masonry units as base for fastenings conduits, tubing, boxes, cabinets, or other equipment shall be prohibited.
- O. The installation of conduit or tubing which has been crushed or deformed shall be prohibited.
- P. All conduits shall be plugged with approved discs during construction and be dry and clean before pulling wires.
- Q. Install conduit to prevent low spots which might accumulate water during or after installation. Where unavoidable, provide junction box with drain fitting at conduit low point.
- R. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- S. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- T. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
- U. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- V. Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).
- W. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

3.3 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 260533

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PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- A. Section 26 05 33.13 - Conduit for Electrical Systems: Flexible conduit connections.

1.2 REFERENCE STANDARDS

- A. 10 CFR 431, Subpart K - Energy Efficiency Program for Certain Commercial and Industrial Equipment - Distribution Transformers; Current Edition.
- B. IEEE C57.94 - IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type Distribution and Power Transformers; 2015.
- C. IEEE C57.96 - IEEE Standard Guide for Loading Dry-Type Distribution and Power Transformers; 2013.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA 409 - Standard for Installing and Maintaining Dry-Type Transformers; 2015.
- F. NEMA ST 20 - Dry-Type Transformers for General Applications; 2014.
- G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 506 - Standard for Specialty Transformers; Current Edition, Including All Revisions.
- J. UL 1561 - Standard for Dry-Type General Purpose and Power Transformers; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include voltage, kVA, impedance, tap configurations, insulation system class and rated temperature rise, efficiency, sound level, enclosure ratings, outline and support point dimensions, weight, required clearances, service condition requirements, and installed features.

- C. Shop Drawings: Provide dimensioned plan and elevation views of transformers and adjacent equipment with all required clearances indicated.
- D. Source Quality Control Test Reports: Include reports for tests designated in NEMA ST 20 as design and routine tests.
- E. Maintenance Data: Include recommended maintenance procedures and intervals.
- F. Project Record Documents: Record actual locations of transformers.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com.
- B. General Electric Company: www.geindustrial.com.
- C. Schneider Electric; Square D Products: www.schneider-electric.us.
- C. Siemens Industry, Inc.: www.usa.siemens.com.

2.2 TRANSFORMERS - GENERAL REQUIREMENTS

- A. Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed, classified, and labeled as suitable for the purpose intended.

- B. Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:
 - 1. Altitude: Less than 3,300 feet (1,000 m).
 - 2. Ambient Temperature:
 - a. Greater than 10 kVA: Not exceeding 104 degrees F (40 degrees C).
 - b. Less than 10 kVA: Not exceeding 77 degrees F (25 degrees C).
- C. Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.
- D. Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.
- E. Basic Impulse Level: 10 kV.
- F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- G. Isolate core and coil from enclosure using vibration-absorbing mounts.
- H. Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.

2.3 GENERAL PURPOSE TRANSFORMERS

- A. Description: Self-cooled, two winding transformers listed and labeled as complying with UL 506 or UL 1561; ratings as indicated on the drawings.
- B. Insulation System and Allowable Average Winding Temperature Rise:
 - 1. Less than 15 kVA: Class 180 degrees C insulation system with 115 degrees C average winding temperature rise.
- C. Coil Conductors: Continuous aluminum windings with terminations brazed or welded.
- D. Winding Taps:
 - 1. Less than 3 kVA: None.
- E. Energy Efficiency: Comply with 10 CFR 431, Subpart K.
- F. Sound Levels: Standard sound levels complying with NEMA ST 20.

- G. Mounting Provisions:
 - 1. Less than 15 kVA: Suitable for wall mounting.

- H. Transformer Enclosure: Comply with NEMA ST 20.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - 2. Construction: Steel.
 - a. Less than 15 kVA: Totally enclosed, non-ventilated.

2.4 SOURCE QUALITY CONTROL

- A. Factory test transformers according to NEMA ST 20.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).

- B. Install products in accordance with manufacturer's instructions.

- C. Install transformers in accordance with NECA 409 and IEEE C57.94.

- D. Use flexible conduit, under the provisions of Section 26 05 33.13, 2 feet (600 mm) minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

- E. Arrange equipment to provide minimum clearances as specified on transformer nameplate and in accordance with manufacturer's instructions and NFPA 70.

- F. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.

- G. Remove shipping braces and adjust bolts that attach the core and coil mounting bracket to the enclosure according to manufacturer's recommendations in order to reduce audible noise transmission.

- H. Where not factory-installed, install lugs sized as required for termination of conductors as indicated.

3.2 CLEANING

- A. Clean dirt and debris from transformer components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 262200

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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. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Molded-case circuit breakers (MCCBs).
 - 4. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of NRTL listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Qualification Data: For qualified testing agency.
- D. Retain first paragraph below if required by seismic criteria applicable to Project. Coordinate with Division 26 Section "Vibration and Seismic Controls for Electrical Systems." See ASCE/SEI 7 for certification requirements for equipment and components.

- E. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

- F. Field quality-control reports.
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

- G. Manufacturer's field service report.

- H. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - 2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

- B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 - 2. Altitude: Not exceeding 6600 feet (2010 m).

- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Engineer and Owner no fewer than seven days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Owner's written permission.
 - 4. Comply with NFPA 70E.

1.7 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.8 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 - 2. Fuse Pullers: Two for each size and type.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
 - 5. Approved Equal.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Fuses: Sizes indicated on drawings.
 - 1. Fuses shall be dual element, time delay, non-renewable with voltage rating and current carrying capacity as required by load or as shown on the Drawings. The current interrupting capacity shall be 100,000 symmetrical RMS amperes minimum.
- D. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.2 NON-FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
 - 5. Approved Equal.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
 - 5. Same Manufacturer as power panels and switchgear.
 - 6. Approved Manufacturer.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
 - 1. Instantaneous trip.
 - 2. Long- and short-time pickup levels.
 - 3. Long- and short-time time adjustments.
 - 4. Ground-fault pickup level, time delay, and I²t response.
- F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

- G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
- H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- I. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- J. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application.
 - 4. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with 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. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
- B. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- E. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

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 the following enclosed controllers rated 600 V and less:
 - 1. Full-voltage manual.

1.3 DEFINITIONS

- A. CPT: Control power transformer.
- B. MCCB: Molded-case circuit breaker.
- C. MCP: Motor circuit protector.
- D. N.C.: Normally closed.
- E. N.O.: Normally open.
- F. OCPD: Overcurrent protective device.
- G. SCR: Silicon-controlled rectifier.

1.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed controllers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.5 SUBMITTALS

- A. Product Data: For each type of enclosed controller. Include manufacturer's technical data on features, performance, electrical characteristics, ratings, and enclosure types and finishes.
- B. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.
 - 1. Show tabulations of the following:
 - a. Each installed unit's type and details.
 - b. Factory-installed devices.
 - c. Nameplate legends.
 - d. Short-circuit current rating of integrated unit.
 - e. Listed and labeled for integrated short-circuit current (withstand) rating of OCPDs in combination controllers by an NRTL acceptable to authorities having jurisdiction.
 - f. Features, characteristics, ratings, and factory settings of individual OCPDs in combination controllers.
 - 2. Wiring Diagrams: For power, signal, and control wiring.

- C. Qualification Data: For qualified testing agency.
- D. Seismic Qualification Certificates: For enclosed controllers, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Field quality-control reports.
- F. Operation and Maintenance Data: For enclosed controllers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Routine maintenance requirements for enclosed controllers and installed components.
 - 2. Manufacturer's written instructions for testing and adjusting circuit breaker and MCP trip settings.
 - 3. Manufacturer's written instructions for setting field-adjustable overload relays.
 - 4. Manufacturer's written instructions for testing, adjusting, and reprogramming reduced-voltage solid-state controllers.
- G. Load-Current and Overload-Relay Heater List: Compile after motors have been installed, and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
- H. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed, and arrange to demonstrate that switch settings for motor running overload protection suit actual motors to be protected.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store enclosed controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - 1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 - 2. Altitude: Not exceeding 6600 feet (2010 m).

- B. Interruption of Existing Electrical Systems: Do not interrupt electrical systems in facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Engineer and Owner no fewer than seven days in advance of proposed interruption of electrical systems.
 - 2. Indicate method of providing temporary utilities.
 - 3. Do not proceed with interruption of electrical systems without Owner's written permission.
 - 4. Comply with NFPA 70E.

1.9 COORDINATION

- A. Coordinate layout and installation of enclosed controllers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.10 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
 - 2. Indicating Lights: Two of each type and color installed.
 - 3. Power Contacts: Furnish three spares for each size and type of magnetic contactor installed.

PART 2 - PRODUCTS

2.1 FULL-VOLTAGE CONTROLLERS

- A. General Requirements for Full-Voltage Controllers: Comply with NEMA ICS 2, general purpose, Class A.
- B. Motor-Starting Switches: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Approved Equal.
 - 2. Configuration: Nonreversing.
 - 3. Surface mounting.
 - 4. Red pilot light.
- C. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

- b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Approved Equal.
- 2. Configuration: Nonreversing.
 - 3. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button.
 - 4. Surface mounting.
 - 5. Red pilot light.
- D. Magnetic Controllers: Full voltage, across the line, electrically held.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - b. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - c. Rockwell Automation, Inc.; Allen-Bradley brand.
 - d. Siemens Energy & Automation, Inc.
 - e. Square D; a brand of Schneider Electric.
 - f. Approved Equal.
 - 2. Configuration: Nonreversing.
 - 3. Contactor Coils: Pressure-encapsulated type.
 - a. Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
 - 4. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 - 5. Control Circuits: 120-V ac; obtained from integral CPT, with primary and secondary fuses, with control power source of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - 6. Melting Alloy Overload Relays:
 - a. Inverse-time-current characteristic.
 - b. Class 10 tripping characteristic.
 - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - 7. Bimetallic Overload Relays:
 - a. Inverse-time-current characteristic.
 - b. Class 10 tripping characteristic.
 - c. Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - d. Ambient compensated.
 - e. Automatic resetting.
 - 8. Solid-State Overload Relay:
 - a. Switch or dial selectable for motor running overload protection.
 - b. Sensors in each phase.
 - c. Class 10 tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.

2.2 ENCLOSURES

- A. Enclosed Controllers: NEMA ICS 6, to comply with environmental conditions at installed location.
 - 1. Dry and Clean Indoor Locations: Type 1.
 - 2. Outdoor Locations: Type 3R.

2.3 ACCESSORIES

- A. General Requirements for Control Circuit and Pilot Devices: NEMA ICS 5; factory installed in controller enclosure cover unless otherwise indicated.
 - 1. Push Buttons, Pilot Lights, and Selector Switches: Heavy-duty type.
 - a. Push Buttons: Covered type.
 - b. Pilot Lights: LED types.
 - c. Selector Switches: Rotary type 3 position hand-off-auto.
- B. 2 N.C. and 2 N.O. auxiliary contact(s).
- C. Control Relays: Auxiliary and adjustable solid-state time-delay relays.
- D. Phase-Failure, Phase-Reversal, and Undervoltage and Overvoltage Relays: Solid-state sensing circuit with isolated output contacts for hard-wired connections. Provide adjustable undervoltage, overvoltage, and time-delay settings.
- E. Cover gaskets for Type 1 enclosures.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive enclosed controllers, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine enclosed controllers before installation. Reject enclosed controllers that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in each fusible-switch enclosed controller.
- D. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.
- E. Install, connect, and fuse thermal-protector monitoring relays furnished with motor-driven equipment.
- F. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
- B. Label each enclosure with engraved nameplate.
- C. Label each enclosure-mounted control and pilot device.

3.4 CONTROL WIRING INSTALLATION

- A. Bundle, train, and support wiring in enclosures.
- B. Connect selector switches and other automatic-control selection devices where applicable.
 - 1. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.
 - 2. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed controller, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- E. Tests and Inspections:
 - 1. Inspect controllers, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment.
 - 2. Test insulation resistance for each enclosed-controller element, component, connecting motor supply, feeder, and control circuits.
 - 3. Test continuity of each circuit.
 - 4. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages. If outside this range for any motor, notify Engineer before starting the motor(s).
 - 5. Test each motor for proper phase rotation.
 - 6. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 7. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 8. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

- F. Enclosed controllers will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports including a certified report that identifies enclosed controllers and that describes results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.6 ADJUSTING

- A. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload-relay pickup and trip ranges.
- B. Adjust overload-relay heaters or settings if power factor correction capacitors are connected to the load side of the overload relays.
- C. Adjust the trip settings of MCPs and thermal-magnetic circuit breakers with adjustable instantaneous trip elements. Initially adjust to six times the motor nameplate full-load ampere ratings and attempt to start motors several times, allowing for motor cooldown between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed eight times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required). Where these maximum settings do not allow starting of a motor, notify Engineer before increasing settings.
- D. Set field-adjustable switches and program microprocessors for required start and stop sequences in reduced-voltage solid-state controllers.

3.7 PROTECTION

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions until enclosed controllers are ready to be energized and placed into service.
- B. Replace controllers whose interiors have been exposed to water or other liquids prior to Substantial Completion.

END OF SECTION 262913

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Section 50 30 00 Hazardous Building Materials Inspection and Inventory

CTDAS/DCS, GBMHC, Fairfield, , Bridgeport, 06610, CT, US, Grant St, 267

Created 2018-10-09 09:12:40 EDT by Jonathan Gentile
Updated 2019-01-02 13:08:19 EST by Jonathan Gentile
Location 41.1889522725258, -73.1673778817545
Status Survey Complete

Job Information

Site Name GBMHC
Address 267 Grant St
Bridgeport, CT 06610
TRC Project Number 317227
Project Manager Donald LePage
Inspector(s) Jonathan Gentile, David Webster
Client CTDAS/DCS
Type of Asbestos Survey Reno/Demo
Additional Testing for NOB Materials PLM EPA 600/R93/116 (w grav. red.)
Additional Analysis for NOB Materials (Calc) PLM EPA 600/R93/116 (w grav. red.)
Date 2018-10-09
General Notes
Survey for the installation of new gas lines and new boilers. Previous sampling data (confirming material as acm, or non-acm) from survey performed in 2015 was used wherever current suspect materials could be identified as being the same.

December 15, 2018
TRC (C Jacko) on-site with AAIS. AAIS cores a wall penetration on the 1st floor storage room at service entrance and 4th floor mechanical room floor. There was no suspect material (vapor barriers) at either location.
XRF readings were also taken at both locations. All Lead readings were <1.

Surveys Performed Asbestos, XRF

Asbestos Section

(2), C, 10, White Sticky Exterior Building Caulk

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:20

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:20

Material Information

Sampled or Assumed?	Sampled
Material Acronym	C, 10
Material Description	White Sticky Exterior Building Caulk
Is Material a Non-Friable Organically Bound (NOB)	Yes
Total Count	(2)

(2), C, 11, Brown Brittle Exterior Building Caulk

Patio behind Unit 4

Sample Location	Patio behind Unit 4
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	10:38

Patio behind Unit 5

Sample Location	Patio behind Unit 5
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	10:39

Material Information

Sampled or Assumed?	Sampled
Material Acronym	C, 11
Material Description	Brown Brittle Exterior Building Caulk
Is Material a Non-Friable Organically Bound (NOB)	No
Total Count	(2)

(2), C, 12, White Flexible Exterior Building Caulk

1st Floor Exterior where Pipes Enter Building

Sample Location	1st Floor Exterior where Pipes Enter Building
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	10:39

1st Floor Exterior Where Pipes Enter Building

Sample Location	1st Floor Exterior Where Pipes Enter Building
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab

Date 2018-10-10
Time 10:40

Material Information

Sampled or Assumed? Sampled
Material Acronym C, 12
Material Description White Flexible Exterior Building Caulk
Is Material a Non-Friable Organically Bound (NOB) Yes
Total Count (2)

(2), C, 13, Tan/Grey Exterior Building Caulk

Exterior Patio by Unit 14

Sample Location Exterior Patio by Unit 14
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:44

Exterior Patio by Unit 14

Sample Location Exterior Patio by Unit 14
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:44

Material Information

Sampled or Assumed? Sampled
Material Acronym C, 13
Material Description Tan/Grey Exterior Building Caulk
Is Material a Non-Friable Organically Bound (NOB) Yes
Total Count (2)

(2), C, 14, Grey Putty-Like Exterior Building Caulk

Roof Vent by Unit 16

Sample Location Roof Vent by Unit 16
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 11:07

Roof Vent by Unit 16

Sample Location Roof Vent by Unit 16

Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	11:07

Material Information

Sampled or Assumed?	Sampled
Material Acronym	C, 14
Material Description	Grey Putty-Like Exterior Building Caulk
Is Material a Non-Friable Organically Bound (NOB)	Yes
Total Count	(2)

(2), DS, 6, Red/Brown Duct Sealant

Mechanical room 44 AC2

Sample Location	Mechanical room 44 AC2
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-09
Time	09:24

Mechanical room 44 AC2

Sample Location	Mechanical room 44 AC2
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-09
Time	09:24

Material Information

Sampled or Assumed?	Sampled
Material Acronym	DS, 6
Material Description	Red/Brown Duct Sealant
Is Material a Non-Friable Organically Bound (NOB)	Yes
Total Count	(2)

(2), FS7, Black Hard Firestop Material

5th FI Mech Room

Sample Location	5th FI Mech Room
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-09
Time	13:36

5th Fl Mech Room

Sample Location	5th Fl Mech Room
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-09
Time	13:37

Material Information

Sampled or Assumed?	Sampled
Material Acronym	FS7
Material Description	Black Hard Firestop Material
Is Material a Non-Friable Organically Bound (NOB)	Yes
Total Count	(2)

(2), RDT1 , Roof Deck Tar

Roof by Unit 16

Sample Location	Roof by Unit 16
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	10:59

Roof by Unit 16

Sample Location	Roof by Unit 16
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	10:59

Material Information

Sampled or Assumed?	Sampled
Material Acronym	RDT1
Material Description	Roof Deck Tar
Is Material a Non-Friable Organically Bound (NOB)	Yes
Total Count	(2)

(7), SC, 1, Exterior Concrete Wall Textured Skim Coating

Exterior by Loading Dock

Sample Location	Exterior by Loading Dock
Analyze by Layer	No
Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab

Date 2018-10-10
Time 10:17

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:17

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:17

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:21

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:21

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No
Asbestos Bulk Analysis PLM EPA 600/R93/116
Grab or Composite Grab
Date 2018-10-10
Time 10:23

Exterior by Loading Dock

Sample Location Exterior by Loading Dock
Analyze by Layer No

Asbestos Bulk Analysis	PLM EPA 600/R93/116
Grab or Composite	Grab
Date	2018-10-10
Time	10:24

Material Information

Sampled or Assumed?	Sampled
Material Acronym	SC, 1
Material Description	Exterior Concrete Wall Textured Skim Coating
Is Material a Non-Friable Organically Bound (NOB)	No
Total Count	(7)

XRF Section

XRF Survey Completed	Yes
XRF Data Downloaded	Yes
XRF Shots >1.0 on non-metallic building materials	No
Date Data Downloaded	2018-12-16

General Information

Signature



Signed 2018-10-11 09:18:28 EDT

Asbestos Samples Submitted to TRC Lab	Yes
Date Submitted to Lab	2018-10-11
App Name	WinBSI HBM Survey 1.0

Generate Report Documentation

Select one or more documents below to be generated. Once completed in the cloud, they will be sent to the listed email address. Please report any difficulties or errors to Justin Coleman.

Where should the document(s) be sent?	jgentile@trcsolutions.com
Generate Documents	N/A

TABLES

**TABLE 1
BULK SAMPLE SUMMARY OF SUSPECT ASBESTOS CONTAINING MATERIALS
GREATER BRIDGEPORT MENTAL HEALTH CENTER
ENERGY UPGRADE PROJECT
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Homogeneous Material	% and Type Asbestos
1	Exterior by Loading Dock	C10 – White Sticky Exterior Building Caulk	ND
2	Exterior by Loading Dock	C10 – White Sticky Exterior Building Caulk	ND*
3	Patio behind Unit 4	C11 – Brown Brittle Exterior Building Caulk	5% chrysotile
4	Patio behind Unit 5	C11 – Brown Brittle Exterior Building Caulk	NA/PS
5	1st Floor Exterior where Pipes Enter Building	C12 – White Flexible Exterior Building Caulk	10% chrysotile
6	1st Floor Exterior Where Pipes Enter Building	C12 – White Flexible Exterior Building Caulk	NA/PS
7	Exterior Patio by Unit 14	C13 – Tan/Grey Exterior Building Caulk	ND
8	Exterior Patio by Unit 14	C13 – Tan/Grey Exterior Building Caulk	ND*
9	Roof Vent by Unit 16	C14 – Grey Putty-Like Exterior Building Caulk	ND
10	Roof Vent by Unit 16	C14 – Grey Putty-Like Exterior Building Caulk	ND*
11	Mechanical room 44 AC2	DS6 – Red/Brown Duct Sealant	ND
12	Mechanical room 44 AC2	DS6 – Red/Brown Duct Sealant	ND*
13	5th Fl Mech Room	FS7 – Black Hard Firestop Material	3% chrysotile
14	5th Fl Mech Room	FS7 – Black Hard Firestop Material	NA/PS
15	Roof by Unit 16	RDT1 – Roof Deck Tar	ND
16	Roof by Unit 16	RDT1 – Roof Deck Tar	ND*
17	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND
18	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND
19	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND
20	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND
21	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND
22	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND
23	Exterior by Loading Dock	SC1 – Exterior Concrete Wall Textured Skim Coating	ND

NA/PVA Not analyzed/positive via inseparable association with a confirmed positive ACM

NA/PS Not analyzed/positive stop, homogeneous to sample proven to contain asbestos

ND<1% Non-detected, less than 1%

NAD No asbestos detected

+ Although found to be negative by analysis, material is homogeneous to a determined ACM and therefore must be considered positive

1 NOB material; result confirmed by TEM analyses

* Analyzed by EPA/600/R-93/116 with gravimetric reduction

**TABLE 2
 IDENTIFIED ASBESTOS CONTAINING MATERIALS (>1%)
 GREATER BRIDGEPORT MENTAL HEALTH CENTER
 ENERGY UPGRADE PROJECT
 BRIDGEPORT, CONNECTICUT**

Material	Sampled- Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	Estimated Quantity
MF2-light grey uncovered mudded fittings on fiberglass lines & MF4, MF5, MF6, MF7- Cloth wrapped mudded fittings on fiberglass insulated pipes	Sampled 10/15	Throughout building (above ceilings, in pipe chases, wall cavities, mechanical rooms, etc.)	Friable	Thermal System Insulation	70 EA
DI2-mudded duct insulation on outside of fiberglass duct insulation on seam (behind canvas wrap)	Sampled 9/15	Mech rooms under canvas wrap over fiberglass duct insulation	Friable	Thermal System Insulation	1,000 SF
FS1-brown putty fire stop (FP3-2/15)	Sampled 9/15 & 2/15*	Rooms 42, 40, 36 & 29 & 1 st , 2 nd , 3 rd , 6 th , 7 th , & 8 th floor mech rooms	Category II Non-friable	Miscellaneous	90 SF
FS7-black putty fire stop	Sampled 10/18	5 th floor mech room	Category II Non-friable	Miscellaneous	5 SF
CT2, CT2A-2'x4' and 2'x2' white long squiggly w/ pinholes and red back ceiling tile (some tiles have vent openings)	Sampled 11/15 & 2/15*	Ground & 2 nd floor hallways, rooms 39, 36 & 241	Friable	Miscellaneous	1,500 SF
C5-tan semi flexible caulk & C6-grey putty-like caulk	Sampled 9/15	Mech room 442, 745 & 845	Category II Non-friable	Miscellaneous	300 LF
C11-brown brittle exterior building caulk	Sampled 10/18	1 st Floor exterior fenced in HVAC unit area	Category I Non-friable	Miscellaneous	70 LF
C12-white flexible exterior building caulk	Sampled 10/18	1 st Floor exterior fenced in HVAC unit area	Category I Non-friable	Miscellaneous	30 LF

**TABLE 3
 CONFIRMED NON-ASBESTOS CONTAINING MATERIALS
 GREATER BRIDGEPORT MENTAL HEALTH CENTER
 ENERGY UPGRADE PROJECT
 BRIDGEPORT, CONNECTICUT**

Material	General Location
C10 – White Sticky Exterior Building Caulk	Exterior by Loading Dock
C13 – Tan/Grey Exterior Building Caulk	Exterior Patio by Unit 14
C14 – Grey Putty-Like Exterior Building Caulk	Roof Vent by Unit 16
DS6 – Red/Brown Duct Sealant	4 th Fl Mechanical Room
RDT1 – Roof Deck Tar	Roof
SC1 – Exterior Concrete Wall Textured Skim Coating	Exterior Wall

**However, associated layers are positive*



Lead Based Paint Measurement Summary Table

Device(s) : Niton XLP301-A (Serial #24792) X Ray Fluorescence (XRF) Spectrum Analyzer
Client : CT DAS/CS
Site : Greater Bridgeport Mental Health Center
Project # : 317227.0000.0001
Date(s) : 12/15/2018
Inspector : Carmen Jacko

Number	Interior/ Exterior	Floor	Room	Side	Structure	Feature	Material	Color	Condition	Reading (mg/cm ²)	Precision (mg/cm ²)	Depth Index	Duration (sec)	Date/Time
1										4.3	0.0		77.71	12/15/2018 10:06
2										4.4	0.0		77.8	12/15/2018 10:23
3				CALIBRATE						0.6	0.1	2.34	20.84	12/15/2018 10:26
4				CALIBRATE						0.7	0.1	2.45	27.29	12/15/2018 10:27
5				CALIBRATE						1.0	0.1	2.54	30.0	12/15/2018 10:28
6		1	154		Vent		Metal	Beige	Intact	0.0	0.02	1.73	11.95	12/15/2018 10:32
7		1	154		Vent		Metal	Beige	Intact	0.0	0.02	1.0	4.09	12/15/2018 10:32
8		1	154		Vent		Metal	Beige	Intact	0.0	0.02	1.0	1.5	12/15/2018 10:32
9		1	154		Pipe		Metal	Beige	Intact	0.1	0.04	6.28	28.7	12/15/2018 10:34
10		1	154		Wall		Concrete	Beige	Intact	0.0	0.02	1.0	30.0	12/15/2018 10:36
11		1	442	C	Wall	CMU	Concrete	Beige	Intact	0.0	0.02	1.19	30.0	12/15/2018 10:44
12		4	442	D	Wall	Vent	Metal	Red	Intact	0.0	0.02	1.0	30.0	12/15/2018 10:47
13		4	442	D	Wall		Concrete	Beige	Intact	0.0	0.02	1.0	30.0	12/15/2018 10:50
14		4	442	D	Vent		Canvas Vent Insulation Cover	Beige	Intact	0.0	0.02	1.38	30.0	12/15/2018 10:53
15		4	442	C	Vent		Metal	Beige	Intact	0.1	0.02	2.27	23.13	12/15/2018 10:55
16		4	442	C	Pipe		Metal	Beige	Intact	0.0	0.02	1.07	30.0	12/15/2018 10:57
17		4	442		Floor		Concrete	Grey	Intact	0.0	0.02	1.0	30.0	12/15/2018 10:59
18			442	CALIBRATE						1.6	0.1	1.33	27.95	12/15/2018 11:03
19			442	CALIBRATE						1.2	0.1	1.39	17.87	12/15/2018 11:03
20			442	CALIBRATE						1.7	0.1	1.21	30.0	12/15/2018 11:04

Lead paint includes paint found to contain **any detectable** amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF).

Side A = Street side; Sides B, C, D follow clockwise

**ASBESTOS BULK SAMPLE CHAIN OF CUSTODY
FORMS
&
PLM LABORATORY ANALYSIS DATA**



21 GRIFFIN ROAD NORTH
WINDSOR, CONNECTICUT 06095
TELEPHONE (860) 298-9692
FAX (860) 298-6380

ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersede Previous Edition

PROJECT NUMBER

317227.0000.0001

PROJECT NAME

CTDAS/DCS
GBMHC, 267 Grant St, Bridgeport,
CT

LAB ID #

52907

TURNAROUND TIME	
PLM:	8hr 24hr 48hr 3day
TEM:	24hr 48hr 3day 5day

SIGNATURE

INSPECTOR

David Webster, Jonathan Gentile

PARAMETERS

PLM EPA 600/R93/116 (POSITIVE STOP)	
PLM EPA 600/R93/116 (w/gravimetric reduction) (POSITIVE STOP)	
ANALYZE BY LAYER	
POINT COUNT (IF >1% & <10%)	
TEM NY NOB 198.4 (IF PLM SERIES NEG)	

MATERIAL

FIELD SAMPLE NUMBER	DATE	TIME	TYPE		SAMPLE LOCATION	PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	MATERIAL
			COMP	GRAB							
1	10/10/18	10:20	X	X	Exterior by Loading Dock	X					C10 - White Sticky Exterior Building Caulk
2	10/10/18	10:20	X	X	Exterior by Loading Dock		X				C10 - White Sticky Exterior Building Caulk
3	10/10/18	10:38	X	X	Patio behind Unit 4	X					C11 - Brown Brittle Exterior Building Caulk
4	10/10/18	10:39	X	X	Patio behind Unit 5		X				C11 - Brown Brittle Exterior Building Caulk
5	10/10/18	10:39	X	X	1st Floor Exterior where Pipes Enter Building	X					C12 - White Flexible Exterior Building Caulk
6	10/10/18	10:40	X	X	1st Floor Exterior Where Pipes Enter Building		X				C12 - White Flexible Exterior Building Caulk
7	10/10/18	10:44	X	X	Exterior Patio by Unit 14	X					C13 - Tan/Grey Exterior Building Caulk
8	10/10/18	10:44	X	X	Exterior Patio by Unit 14		X				C13 - Tan/Grey Exterior Building Caulk
9	10/10/18	11:07	X	X	Roof Vent by Unit 16	X					C14 - Grey Putty-Like Exterior Building Caulk
10	10/10/18	11:07	X	X	Roof Vent by Unit 16		X				C14 - Grey Putty-Like Exterior Building Caulk
11	10/9/18	09:24	X	X	Mechanical room 44 AC2	X					DS6 - Red/Brown Duct Sealant

Relinquished by: (Signature) 	Date: 10/11/18	Relinquished by: (Signature)	Date:
(Printed) Jonathan Gentile	(Printed) 10/11/18	(Printed)	(Printed)
Remarks: REFER TO 2015 SURVEY REPORT FOR MATERIAL ACRONYMS PRECEDING HIGHER NUMBERS ON THIS COC.		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Comments: Page 1 of 2	



21 GRIFFIN ROAD NORTH
WINDSOR, CONNECTICUT 06095
TELEPHONE (860) 298-9692
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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

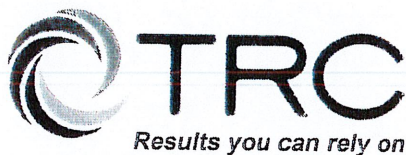
*Edition: October 2009
Supersede Previous Edition*

PROJECT NUMBER 317227.0000.0001		PROJECT NAME CTDAS/DCS GBMHC, 267 Grant St, Bridgeport, CT		PARAMETERS				LAB ID #. 52907	
SIGNATURE 		INSPECTOR David Webster, Jonathan Gentile		PLM EPA 600/R93/116 (POSITIVE STOP)		POINT COUNT (IF >1% & <10%)		TURNAROUND TIME	
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	PLM EPA 600/R93/116 (POSITIVE STOP)	ANALYZE BY LAYER	TEM NY NOB 198.4 (IF PLM SERIES NEG)	8hr	24hr
								24hr	48hr
12	10/9/18	09:24	X	Mechanical room 44 AC2	X				
13	10/9/18	13:36	X	5th Fl Mech Room	X				
14	10/9/18	13:37	X	5th Fl Mech Room	X				
15	10/10/18	10:59	X	Roof by Unit 16	X				
16	10/10/18	10:59	X	Roof by Unit 16	X				
17	10/10/18	10:17	X	Exterior by Loading Dock	X				
18	10/10/18	10:17	X	Exterior by Loading Dock	X				
19	10/10/18	10:17	X	Exterior by Loading Dock	X				
20	10/10/18	10:21	X	Exterior by Loading Dock	X				
21	10/10/18	10:21	X	Exterior by Loading Dock	X				
22	10/10/18	10:23	X	Exterior by Loading Dock	X				
23	10/10/18	10:24	X	Exterior by Loading Dock	X				
MATERIAL									
DS6 – Red/Brown Duct Sealant									
FS7 – Black Hard Firestop Material									
FS7 – Black Hard Firestop Material									
RDT1 – Roof Deck Tar									
RDT1 – Roof Deck Tar									
SCI – Exterior Concrete Wall Textured Skim Coating									
SCI – Exterior Concrete Wall Textured Skim Coating									
SCI – Exterior Concrete Wall Textured Skim Coating									
SCI – Exterior Concrete Wall Textured Skim Coating									
SCI – Exterior Concrete Wall Textured Skim Coating									
SCI – Exterior Concrete Wall Textured Skim Coating									
SCI – Exterior Concrete Wall Textured Skim Coating									

Relinquished by: (Signature) 	Date: 10/11/18	Received by: (Signature) 	Date: 10/11/18
(Printed) Jonathan Gentile	Time: 1115	(Printed) 1115	Time: (Printed)
Remarks: REFER TO 2015 SURVEY REPORT FOR MATERIAL ACRONYMS PRECEDING HIGHER NUMBERS ON THIS COC.		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Page 2 of 2	

PLM Gravimetric Analysis

Date	Analyst	Lab Log #	Sample ID	Crucible ID	g crucible	g crucible plus sample	g after 480°	decimal		% Asb in residue	% Asb total Sample
								Residue	Residue		
10/11/2018	KW	52907	2	96	29.5077	29.8766	29.6503	0.387	0.387	0.00	0.00
			8	99	17.6144	17.7943	17.7457	0.730	0.730	0.00	0.00
			10	100	18.5544	18.683	18.653	0.767	0.767	0.00	0.00
			12	101	23.4682	23.4853	23.47	0.105	0.105	0.00	0.00
			16	103	19.7363	19.8963	19.7415	0.032	0.032	0.00	0.00



BULK ASBESTOS ANALYSIS REPORT

CLIENT: CT Department of Construction Services

Lab Log #: 0052907
 Project #: 317227.0001.0000
 Date Received: 10/11/2018
 Date Analyzed: 10/12/2018

Site: GBMHC, 267 Grant Street, Bridgeport, CT

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
1	White (caulk)	Yes	No	--	---	ND	None
2♣	White (caulk)	Yes	No	--	---	ND	None
3	Brown (caulk)	Yes	No	--	---	5%	Chrysotile
4	--	--	--	--	--	NA/PS	--
5	White (caulk)	Yes	No	--	10% mineral wool	10%	Chrysotile
6	--	--	--	--	--	NA/PS	--
7	Tan/Grey (caulk)	Yes	No	--	---	ND	None
8♣	Tan/Grey (caulk)	Yes	No	--	---	ND	None
9	Grey (caulk)	Yes	No	--	---	ND	None
10♣	Grey (caulk)	Yes	No	--	---	ND	None
11	Red/Brown (sealant)	Yes	No	--	---	ND	None
12♣	Red/Brown (sealant)	Yes	No	--	---	ND	None
13	Black (firestop)	Yes	No	--	---	3%	Chrysotile
14	--	--	--	--	--	NA/PS	--
15	Black (roof deck tar)	Yes	No	--	---	ND	None
16♣	Black (roof deck tar)	Yes	No	--	---	ND	None
17	Beige (skim coat)	Yes	No	--	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP.LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387



POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
18	Beige (skim coat)	Yes	No	--	---	ND	None
19	Beige (skim coat)	Yes	No	--	---	ND	None
20	Beige (skim coat)	Yes	No	--	---	ND	None
21	Beige (skim coat)	Yes	No	--	---	ND	None
22	Beige (skim coat)	Yes	No	--	---	ND	None
23	Beige (skim coat)	Yes	No	--	---	ND	None

*Samples analyzed by EPA/600/R-93/116 with gravimetric reduction

Reporting limit- asbestos present at 1%

ND - asbestos was not detected

Trace - asbestos was observed at level of less than 1%

NA/PS - Not Analyzed / Positive Stop

SNA- Sample Not Analyzed- See Chain of Custody for details

Note: Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. In those cases, EPA recommends, and certain states (e.g. NY) require, that negative results be confirmed by quantitative transmission electron microscopy.

The Laboratory at TRC follows the EPA's Interim Method for the Determination of Asbestos in Bulk Insulation 1982 (EPA 600/M4-82-020) Bulk Analysis Code 18/A01 and the EPA recommended Method for the Determination of Asbestos in Bulk Building Materials July 1993, R.L. Perkins and B.W. Harvey, (EPA/600/R-93/116) Bulk Analysis Code 18/A03, which utilize polarized light microscopy (PLM). Our analysts have completed an accredited course in asbestos identification. TRC's Laboratory is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), for Bulk Asbestos Fiber Analysis, NVLAP Code 18/A01, effective through June 30, 2019. TRC is accredited by the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC in the Industrial Hygiene Program (IHLAP) for PLM effective through October 1, 2019. Asbestos content is determined by visual estimate unless otherwise indicated. Quality Control is performed in-house on at least 10% of samples and QC data related to the samples is available upon written request from client.

This report shall not be reproduced, except in full, without the written approval of TRC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report relates only to the items tested.

Analyzed by: K. Williamson
 Kathleen Williamson, Laboratory Manager

Reviewed by: Cathryn Lemire
 Cathryn Lemire, Approved Signatory

Date Issued
 10/13/2018

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

REPORT

ASBESTOS OPERATIONS AND MAINTENANCE PROGRAM GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER 1635 CENTRAL AVENUE BRIDGEPORT, CONNECTICUT

Project No. MH-15-18
DCS Building No. 02912

Prepared for

State of Connecticut
Department of Administration Services
Division of Construction Services
Hartford, Connecticut

Prepared by

TRC Environmental Corporation
Windsor, Connecticut

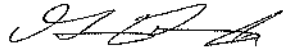
April 2017

**ASBESTOS OPERATIONS AND
MAINTENANCE PROGRAM
GREATER BRIDGEPORT COMMUNITY
MENTAL HEALTH CENTER
1635 CENTRAL AVENUE
BRIDGEPORT, CONNECTICUT**

Project No. MH-15-18
DCS Building No. 02912


Prepared for
State of Connecticut
Department of Administration Services
Division of Construction Services
Hartford, Connecticut

Prepared by
TRC Environmental Corporation
Windsor, Connecticut



Gregory Kaczynski

Asbestos Inspector
License #000550



Donald LePage

Project Manager

TRC Project No. 244600.0001.0000
April 2017

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- M ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORMS

1.0 INTRODUCTION

1.1 Asbestos Handling Policy

Any activity or procedure, whether performed by approved in-house personnel or outside contractors, that directly or indirectly relates to ACM shall be covered under the administration of the O&M Program. General cleaning and housekeeping tasks shall take into consideration the proper recognition, methods, protection, and in some cases, actual handling of asbestos containing materials

It is the further objective of the Greater Bridgeport Community Mental Health Center (GBCMHC) to minimize building occupant exposure to airborne asbestos fibers by implementing this Asbestos Operations and Maintenance (O&M) Plan at this facility.

The Operations and Maintenance (O&M) Plan is an essential element of a total control program for the asbestos-containing materials (ACM) present in a facility or building. An O&M Program can be defined as a formulated plan of hazard communication, training, periodic surveillance, housekeeping, maintenance repair/cleanup and emergency response to properly manage ACM in place. The purpose of an O&M Program is to:

1. Periodically inspect ACM for signs of damage or deterioration.
2. Conduct necessary housekeeping/emergency clean-ups safely.
3. Provide direction, supervision and documentation for asbestos related activities.
4. Ensure proper communication and notification of the presence and location of ACM, and provide for effective training in managing the ACM in place.

1.2 Facility's Asbestos Manager

Mr. Tom Ford will be the Facility's Asbestos Manager for the GBCMHC Building. The Facility's Asbestos Manager shall coordinate and approve all Facility's work activities related to ACM including:

- Provide hazard communication information to all of The GBCMHC employees and contractors who may encounter ACM;
- Inform maintenance staff, custodial staff and outside contractors (i.e. electrical, telephone, etc. repair personnel) of the location of ACM for routine work;
- Review proposed building maintenance and renovation activities and determine their potential impact to existing ACM;
- Notify appropriate personnel when asbestos related work may result in asbestos exposure;
- Require that only contractors trained in asbestos hazard and control measures be allowed to handle the ACM;

- Arrange for a State of Connecticut Licensed Asbestos Abatement Contractor to work on the asbestos and for an Industrial Hygiene firm to oversee the work activities and provide air monitoring services;
- Ensure that abatement projects are properly notified to the Connecticut Department of Public Health (CTDPH) and USEPA using the appropriate forms
- Ensure that final air clearance testing is conducted following abatement involving greater than 3SF/3LF of ACM and the results are submitted to the CTDPH on the appropriate form
- Ensure that any ACM removed from the facility is disposed in accordance with federal and state regulations and tracked using the CTDPH asbestos waste shipment record;
- Inspect identified ACM periodically to ensure it is not deteriorating in a manner that may result in fiber release;
- Be knowledgeable in practices and procedures for asbestos management and maintain an appropriate level of training;
- Review this plan annually to ensure it complies with any changes in applicable regulations.

1.3 Facility Description

The GBCMHC Building has 9 levels. All of these areas are presently identified as having asbestos containing or assumed asbestos containing building material. The ground floor is the main entry point for the building and consists of a main lobby, locker rooms, offices and storage and maintenance areas. Floors 1 – 9 are a combination of offices and patient rooms and services. There is a mechanical room on each floor. The 3rd floor also has a cafeteria/kitchen area and a connector to the neighboring hospital (which is included in this plan). There are two main stairwells and three elevators which service the building.

2.0 **REGULATORY SUMMARY**

The GBCMHC Building is regulated to various extents under the following sets of asbestos regulations, depending upon the type of activity being conducted at their facility:

- CTDPH Standards for Asbestos Abatement (19a-332a-1 through 16)
- CTDPH Asbestos Licensure and Training Reqs. (20-440-1 through 9 and 20-441)
- OSHA Asbestos General Industry Standards (29 CFR 1910.1001)
- OSHA Asbestos in Construction Standards (29 CFR 1926.1101)
- EPA Asbestos NESHAP (40 CFR Part 61 Subpart M)
- EPA Asbestos Model Accreditation Plan (40 CFR Part 763 Subpart E, App. C)

A glossary of terms used in asbestos work, these regulations and this O&M Plan is included in **Appendix B**. A summary of the Applicable Regulations is included in **Appendix C**.

The following reference documents are also available to assist in the implementation of the O&M Plan.

- EPA's Guidance For Controlling Asbestos-Containing Materials in Buildings – June 1985 (Purple Book)
- EPA's Asbestos in Buildings – Guidance For Service and Maintenance Personnel – July 1985
- EPA's Managing Asbestos In Place: A Building Owner's Guide to Operations and Maintenance Programs for Asbestos Containing Materials - July 1990 (Green Book)
- EPA's Recommended Interim Guidance for Maintenance of Asbestos-Containing Floor Coverings – 1990
- EPA's A Guide to Performing Reinspections Under the Asbestos Hazard Emergency Response Act (AHERA) – February 1992 (Yellow Book)

3.0 IDENTIFIED ACM/PACM AND HAZARD ASSESSMENT

The following tables summarize the identification, location and quantity of known ACM and confirmed non-ACM at the GBCMHC Building. These tables are based on investigative surveys for asbestos-containing materials conducted by TRC Environmental, Inc. of Windsor, Connecticut.

The U.S. Environmental Protection Agency has produced a draft document entitled *Guidance for Assessing and Managing Exposure to Asbestos in Buildings*. The EPA report proposes the use of "decision trees" for estimating the risks posed by exposure to ACBM and recommends certain response actions which are consistent with the Asbestos Hazard Emergency Response Act (AHERA) regulations. TRC's asbestos hazard assessments and recommendations are derived from these guidelines for each material noted.

The two factors that must be evaluated when doing a hazard assessment for friable asbestos are the present condition of the ACBM and the potential for future disturbance of the ACBM. To use the EPA's Decision Tree, the present condition of the friable ACBM is evaluated as either being significantly damaged, damaged or not damaged. The potential for future disturbance takes into account a number of factors which include accessibility to building occupants, level of activity of building occupants, mechanical vibrations and air erosion. The response actions then selected for each type of ACM are sufficient to protect human health and the environment. Generally, there are five recognized courses of action to control ACBM: 1) removal and disposal; 2) repair; 3) enclose; 4) encapsulate; and 5) operations and maintenance (O&M) programs. The U.S. EPA has indicated that there are no longer any grounds for deferring action in a building with ACBM. Even when ACBM is identified in a building and exists under ideal conditions (non-friable, minimum access, no physical damage, etc.), the absolute minimum corrective action that should be taken consists of a comprehensive O&M program and periodic re-inspection of the building.

TRC's recommendations for a specific corrective action or abatement measure are also presented in the attached table for each type of ACM in each homogeneous area. The response actions are based on the U.S. EPA's Decision Tree (enclosed) and have been developed by an EPA accredited asbestos management planner.

**TABLE 1
BULK SAMPLE SUMMARY OF SUSPECT ASBESTOS CONTAINING MATERIALS
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
1	Room 4	VB1 – black, paper/tar floor vapor barrier	ND
2	Room 4	VB1 – black, paper/tar floor vapor barrier	ND*
3	BMH 170	FD1-white insulation in wood fire door (weldwood composite – underwriter laboratories)	60% chrysotile
4	BMH 170	FD1-white insulation in wood fire door (weldwood composite – underwriter laboratories)	NA/PS
5	BMH 149	FD1-white insulation in wood fire door (weldwood composite – underwriter laboratories)	NA/PS
6	BMH 250	FD2 – white insulation in wood fire door with 6’x3’ window	60% chrysotile
7	Room 502	FD3-white insulation in 8’ high wood double doors with 1’x4’ window	30% amosite
8	BMH 802	FD3-white insulation in 8’ high wood double doors with 1’x4’ window	NA/PS
9	BMH 802	FD3-white insulation in 8’ high wood double doors with 1’x4’ window	NA/PS
10	BMH 518	FD4-tan/red corrugated paper insulation in metal fire door with 1’x1’ window	ND
11	BMH518	FD4-tan/red corrugated paper insulation in metal fire door with 1’x1’ window	ND
12	Room 314B	DWG1 – soft gray, putty glaze on wood door window	ND
13	Room 19	DWG1 – soft gray, putty glaze on wood door window	ND*
14	2 nd floor – stair 2	DWG2 – soft gray, putty glaze on metal door window	5% chrysotile
15	Corridor 37	DWG2 – soft gray, putty glaze on metal door window	NA/PS

NA/PVA Not analyzed/positive via inseparable association with a confirmed positive ACM

NA/PS Not analyzed/positive stop, homogeneous to sample proven to contain asbestos

ND<1% Non-detected, less than 1%

NAD No asbestos detected

+ Although found to be negative by analysis, material is homogeneous to a determined ACM and therefore must be considered positive

‡ Result confirmed by TEM analyses

* Quantified by PLM Point Counting techniques

^ Quantified by PLM Gravimetric Reduction analysis

** Determined to be negative by PLM Gravimetric Reduction analysis (See samples 170-174). TEM results are to be disregarded due to sample contamination from underlying ACM materials.

**TABLE 1
BULK SAMPLE SUMMARY OF SUSPECT ASBESTOS CONTAINING MATERIALS
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
16	Corridor 146	DWG3 – hard gray glaze on metal door mesh window	3% chrysotile
17	Corridor 31	DWG3 – hard gray glaze on metal door mesh window	NA/PS
18	3 rd floor – cafeteria	DWG4 – black putty glazing on metal door window glaze	ND
19	3 rd floor – serving area	DWG4 – black putty glazing on metal door window glaze	ND*
20	Room 662	DWG5- black putty glazing on metal door window	ND
21	Room 662	DWG5- black putty glazing on metal door window	ND*
01	Room 4	MF1-light grey mudded fittings	ND
02	Corridor 6	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
03	Room 25	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
04	Room 16 (12"OD line)	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
05	Room 14B	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
06	Corridor 37 (6"OD line)	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
07	1 st floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
08	1 st floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
09	1 st floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
10	1 st floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
11	1 st floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND

NAPVA Not analyzed/positive via inseparable association with a confirmed positive ACM

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BULK SAMPLE SUMMARY OF SUSPECT ASBESTOS CONTAINING MATERIALS
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
12	Room 152 (12" OD line)	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
13	2 nd floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	Trace chrysotile
14	2 nd floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	2% chrysotile
15	2 nd floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
16	Room 241 (5" OD line)	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
17	Room 239 (6" OD line)	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
18	3 rd floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
19	3 rd floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
20	Kitchen 318	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
21	4 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
22	4 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
23	4 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
24	4 th floor – PC3	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
25	4 th floor – PC3	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
26	5 th floor – PC3	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
27	5 th floor – PC3	MF2-light grey uncovered mudded fittings on fiberglass lines	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
28	5 th floor – PC3	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
29	5 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
30	5 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
31	Room 652	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
32	Room 652	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
33	7 th floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
34	7 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
35	7 th floor – PC2	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
36	7 th floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
37	7 th floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
38	8 th floor – PC1	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
39	8 th floor - damas	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
40	8 th floor - damas	MF2-light grey uncovered mudded fittings on fiberglass lines	ND
41	Room 861	Roof drain fitting	ND
42	3 rd floor mech room	MF3 – cloth wrapped on 7" OD fg line	Trace chrysotile
43	5 th floor mech room	MF3 – cloth wrapped on 7" OD fg line	ND
44	7 th floor mech room	MF3 – cloth wrapped on 7" OD fg line	ND
45	8 th floor mech room	MF3 – cloth wrapped on 7" OD fg line	ND
46	Ground floor mech room	MF4 – cloth wrapped on 2" or 3" OD fg line	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
47	Ground floor mech room	MF4 – cloth wrapped on 2" or 3" OD fg line	ND
48	Room 32	MF4 – cloth wrapped on 2" or 3" OD fg line	60% chrysotile
49	Room 152	MF4 – cloth wrapped on 2" or 3" OD fg line	ND
50	7 th floor mech room	MF4 – cloth wrapped on 2" or 3" OD fg line	ND
51	5 th floor mech room	MF4 – cloth wrapped on 2" or 3" OD fg line	ND
52	Room 49	MF5 – 6" OD MF on uninsulated line	ND
53	2 nd floor mech room	MF5 – 6" OD MF on uninsulated line	ND
54	Ground floor mech room	MF6 – 4"+6" OD fg lines with cloth covered MFs	ND
55	Ground floor mech room	MF6 – 4"+6" OD fg lines with cloth covered MFs	ND
56	Ground floor mech room	MF6 – 4"+6" OD fg lines with cloth covered MFs	ND
57	Ground floor mech room	MF6 – 4"+6" OD fg lines with cloth covered MFs	ND
58	Room 152	MF6 – 4"+6" OD fg lines with cloth covered MFs	ND
59	Entry 337	MF7-white uncovered mudded fitting on 6" OD fg line	60% chrysotile
60	3 rd floor connector	MF7-white uncovered mudded fitting on 6" OD fg line	NA/PS
61	Corridor 2	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND
62	Corridor 102	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND
63	Room 202	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND
64	Lobby 301	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
65	Room 328B	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND
66	Room 655	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND
67	Room 825	CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)	ND
68	Room 39	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
69	Corridor 144	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
70	Corridor 114	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
71	Room 124	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
72	Room 206	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
73	Corridor 332	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
74	Reception 403	CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
75	Corridor 6	CT3A – 2x2 comma, pinhole ceiling tile	ND
76	Room 126A	CT3A – 2x2 comma, pinhole ceiling tile	ND
77	Room 228	CT3A – 2x2 comma, pinhole ceiling tile	ND
78	Rec 618	CT3A – 2x2 comma, pinhole ceiling tile	ND
79	Room 718	CT3A – 2x2 comma, pinhole ceiling tile	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
80	Room 35	CT1-2x2 long squiggly/pinhole/dot w/ vent, red back ceiling tiles	ND
81	Room 427	CT1-2x2 long squiggly/pinhole/dot w/ vent, red back ceiling tiles	ND
82	Room 25	CT2 - 2x2 wormhole/pinhole ceiling tile (some have vents)	ND
83	3 rd floor - cafeteria	CT2 - 2x2 wormhole/pinhole ceiling tile (some have vents)	ND
84	Room 41	CT3 - 2x4 comma pinhole ceiling tile	ND
85	Room 120	CT3 - 2x4 comma pinhole ceiling tile	ND
86	Room 512	CT3 - 2x4 comma pinhole ceiling tile	ND
87	Room 826	CT3 - 2x4 comma pinhole ceiling tile	ND
88	Room 106A	CT5 - 2x4 busy wormhole/pinhole	ND
89	Room 106A	CT5 - 2x4 busy wormhole/pinhole	ND
90	Corridor 163	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
91	Room 209	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
92	Corridor 316	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
93	Entry 337	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
94	Room 430	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
95	Room 612	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)	ND
96	Room 137	CT7-2x4 wormhole pinhole ceiling tile	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
97	Room 137	CT7-2x4 wormhole pinhole ceiling tile	ND
98	Room 202	CT8-1x1 splined wormhole/divot ceiling tile (replacement)	ND
99	Room 328B	CT8-1x1 splined wormhole/divot ceiling tile (replacement)	ND
100	3 rd floor - cafeteria	CT9 - 1x1 white spline w/long squiggles ceiling tile (no red back)	ND
101	3 rd floor - cafeteria	CT9 - 1x1 white spline w/long squiggles ceiling tile (no red back)	ND
102	Kitchen 318	CT10-2x2 sheetrock ceiling tile	ND
103	Serving 319	CT10-2x2 sheetrock ceiling tile	ND
104	Corridor 586	CT11-2x2 mountainous texture multisize pinhole ceiling tile	ND
105	Corridor outside room 746	CT11-2x2 mountainous texture multisize pinhole ceiling tile	ND
106	Corridor outside room 761	CT11-2x2 mountainous texture multisize pinhole ceiling tile	ND
107	Corridor 203	WG1-hard grey brittle glaze on interior metal framed windows	5% chrysotile
108	Corridor 709	WG1-hard grey brittle glaze on interior metal framed windows	NA/PS
109	Room 228	WG2-dark grey putty window glaze	5% chrysotile
110	Room 228	WG2-dark grey putty window glaze	NA/PS
111	Room 735	WG3-grey putty window glazing	5% chrysotile
112	Room 735	WG3-grey putty window glazing	NA/PS
113	Room 826	WG4-grey hard glazing on interior or exterior windows (that don't open)	3% chrysotile
114	Room 142	WG4-grey hard glazing on interior or exterior windows (that don't open)	NA/PS
115	Room 409	WG5-dark grey window glazing on interior of exterior windows (that open)	5% chrysotile

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GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
116	Room 609	WG5-dark grey window glazing on interior of exterior windows (that open)	NA/PS
117	Room 8	CG1-blue sticky carpet glue	ND
118	Room 8	CG1-blue sticky carpet glue	ND*
119	Room 162	CG2-sticky yellow carpet glue	ND
120	Corridor 102	CG2-sticky yellow carpet glue	ND*
121	Room 612	CG2-sticky yellow carpet glue	ND
122	Corridor 163	CG3-brittle yellow carpet glue	ND
123	Corridor 163	CG3-brittle yellow carpet glue	ND*
124	Room 4	G1-residual yellow creamish carpet glue	ND
125	Room 4	G1-residual yellow creamish carpet glue	ND*
126	2 nd floor mech room	G2-yellow glue under fiberglass associated w/DW1 (between fg/metal)	ND
127	4 th floor mech room	G2-yellow glue under fiberglass associated w/DW1 (between fg/metal)	ND*
128	Room 159	G3-grey glue behind Styrofoam insulation behind electric base heater	ND
129	Room 159	G3-grey glue behind Styrofoam insulation behind electric base heater	ND*
130	Room 142	G4-light cream/grey glue under foil fiberglass duct insulation	ND
131	Room 142	G4-light cream/grey glue under foil fiberglass duct insulation	ND*
132	Serving 319	G5-cream glue behind 4"x4" ceramic wall tile	ND
133	Serving 319	G5-cream glue behind 4"x4" ceramic wall tile	ND*
134	Corridor outside room 731	G6-cream glue behind sheetrock on column	ND
135	Corridor outside room 731	G6-cream glue behind sheetrock on column	ND*

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Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
136	Corridor 413 (above drop ceilings)	G7-soft flexible glue under yellow Styrofoam on backside of upper windows	ND
137	Corridor 413 (above drop ceilings)	G7-soft flexible glue under yellow Styrofoam on backside of upper windows	ND*
138	7 th floor (above drop ceilings)	G8-tan flexible glue daubs behind blue Styrofoam on upper walls	ND
139	Ground floor lobby (above drop ceilings)	G8-tan flexible glue daubs behind blue Styrofoam on upper walls	ND*
140	3 rd floor - connector	G9-white glue under cloth sill	ND
141	3 rd floor - connector	G9-white glue under cloth sill	2.1% chrysotile*
142	Room 4	FS1-brown putty fire stop	10% chrysotile
143	Room 241	FS1-brown putty fire stop	NA/PS
144	4 th floor - PC2	FS1-brown putty fire stop	NA/PS
145	7 th floor mech room	FS1-brown putty fire stop	NA/PS
146	2 nd floor mech room	FS2-red flexible fire stop	ND
147	Room 409	FS2-red flexible fire stop	ND*
148	Corridor outside room 641	FS2-red flexible fire stop	ND
149	8 th floor mech room	FS2-red flexible fire stop	ND
150	Room 225	FS3-crumbly, brick colored firestop	ND
151	5 th floor mech room	FS3-crumbly, brick colored firestop	ND*
152	8 th floor mech room	FS3-crumbly, brick colored firestop	ND
153	Room 70	FS5-brown flexible firestop	ND
154	Room 209	FS5-brown flexible firestop	ND*
155	Room 802	FS6-liable light red w/ white spots fire stop	ND
156	Room 802	FS6-liable light red w/ white spots fire stop	ND*
157	Room 20	SHR1-light grey sheetrock	ND

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Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
		White joint compound	ND
158	Room 142	SHR1-light grey sheetrock	ND
		White joint compound	ND
159	Room 126A	SHR1-light grey sheetrock	ND
		White joint compound	ND
160	3 rd floor – cafeteria column	SHR1-light grey sheetrock	ND
		White joint compound	ND
161	3 rd floor – cafeteria beam	SHR1-light grey sheetrock	ND
		White joint compound	ND
162	Room 409	SHR1-light grey sheetrock	ND
		White joint compound	ND
163	Rec 618	SHR1-light grey sheetrock	ND
		White joint compound	ND
164	Corridor outside room 641	SHR1-light grey sheetrock	ND
		White joint compound	ND
165	Corridor outside room 731	SHR1-light grey sheetrock	ND
		White joint compound	ND
166	Room 735	SHR1-light grey sheetrock	ND
		White joint compound	ND
167	Hall outside room 841	SHR1-light grey sheetrock	ND
		White joint compound	ND
168	PC2	SHR2-light grey sheetrock – 1” thick (backing in bathroom wall) (no JC)	ND
169	PC2	SHR2-light grey sheetrock – 1” thick (backing in bathroom wall) (no JC)	ND
170	Ground floor mech room	SHR2A-light grey sheetrock	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
		Skimcoat	ND
171	Ground floor mech room	SHR2A-light grey sheetrock	ND
		Skimcoat	ND
172	Room 314B	SHR3-light grey sheetrock (no jc) associated with wall panels	ND
173	Room 314C	SHR3-light grey sheetrock (no jc) associated with wall panels	ND
174	Room 802	SHR4-light grey sheetrock	ND
		Tan skimcoat	Trace chrysotile
175	Room 802	SHR4-light grey sheetrock	ND
		Tan skimcoat	Trace chrysotile
176	Room 7	FT1-12x12 multi-color cream confetti floor tile	NA/PS
		Residual black mastic associated with FT1	5% chrysotile
177	Room 7	FT1-12x12 multi-color cream confetti floor tile	NA/PS
		Residual black mastic associated with FT1	NA/PS
178	Room 8	FT2-12x12 cream floor tile	NA/PS
		Yellow & black mastic associated with FT2	3% chrysotile
179	Room 8	FT2-12x12 cream floor tile	NA/PS
		Yellow & black mastic associated with FT2	NA/PS
180	Room 14B	FT3-12x12 white confetti floor tile	ND
		Grey glue associated with FT3	ND
181	Room 14B	FT3-12x12 white confetti floor tile	ND*
		Grey glue associated with FT3	ND*

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Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
182	Room 14A	FT4-tan floor tile (remnants only)	ND
		Yellow glue associated with FT4	ND
183	Room 14A	FT4-tan floor tile (remnants only)	ND*
		Yellow glue associated with FT4	ND*
184	Room 149	FT4A-12x12 tan with white confetti floor tile	NA/PS
		Black mastic associated with FT4A	3% chrysotile
185	Room 649	FT4A-12x12 tan with white confetti floor tile	NA/PS
		Black mastic associated with FT4A	NA/PS
186	Room 16	FT5-12x12 light beige confetti floor tile	NA/PS
		Black & tan mastic associated with FT5	5% chrysotile
187	Room 25	FT5-12x12 light beige confetti floor tile	NA/PS
		Black & tan mastic associated with FT5	NA/PS
188	Room 160	FT5B-12x12 light beige confetti floor tile	ND
		Yellow mastic associated with FT5B	ND
189	Room 126A	FT5B-12x12 light beige confetti floor tile	ND*
		Yellow mastic associated with FT5B	ND*
190	Room 328B	FT5B-12x12 light beige confetti floor tile	ND
		Yellow mastic associated with FT5B	ND
191	Room 309	FT5C-12x12 lighter beige confetti floor tile	ND
		Yellow mastic associated with FT5C	ND
192	Room 305	FT5C-12x12 lighter beige confetti floor tile	ND*

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GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
		Yellow mastic associated with FT5C	ND*
193	Room 409	FT5C-12x12 lighter beige confetti floor tile	ND
		Yellow mastic associated with FT5C	ND
194	Room 103	FT6-12x12 light tan w. small brown & white flecks floor tile	NA/PS
		Amber glue associated with FT6	3% chrysotile
195	Room 112	FT6-12x12 light tan w. small brown & white flecks floor tile	NA/PS
		Amber glue associated with FT6	NA/PS
196	Reception 205 (border/center design)	FT7A-12x12 yellow confetti floor tile	ND
		Yellow glue associated with FT7A	ND
197	Reception 205 (border/center design)	FT7A-12x12 yellow confetti floor tile	ND*
198	Reception 205 (border/center design)	FT7B-12x12 dark grey confetti floor tile	ND
199	Corridor 216 (border/center design)	FT7B-12x12 dark grey confetti floor tile	ND*
		Yellow glue associated with FT7B	ND*
200	Room 205	FT9-12x12 grey with heavy white streaks floor tile	NA/PS
		Black mastic associated with FT9	5% chrysotile
201	Room 205	FT9-12x12 grey with heavy white streaks floor tile	NA/PS
		Black mastic associated with FT9	NA/PS
202	Corridor 216	FT10-12x12 tan with maroon streaks floor tile	ND
		Yellow glue associated with FT10	ND
203	Corridor 240	FT10-12x12 tan with maroon streaks floor tile	ND*
		Yellow glue associated with FT10	ND*

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
204	Room 225	FT11-12x12 dark tan with dark & light tan streaks floor tile	NA/PS
		Black mastic associated with FT11	5% chrysotile
205	Room 241	FT11-12x12 dark tan with dark & light tan streaks floor tile	NA/PS
		Black mastic associated with FT11	NA/PS
206	Room 211	FT12-12x12 green with small black and white flecks floor tile	NA/PS
		Black mastic associated with FT12	5% chrysotile
207	Room 211	FT12-12x12 green with small black and white flecks floor tile	NA/PS
		Black mastic associated with FT12	NA/PS
208	Room 213	FT13-12x12 light brown floor tile	NA/PS
		Black mastic associated with FT13	5% chrysotile
209	Room 213	FT13-12x12 light brown floor tile	NA/PS
		Black mastic associated with FT13	NA/PS
210	Cafeteria	FT14-12x12 dark grey with white/pink/blue confetti floor tile	ND
		Yellow glue associated with FT14	ND
211	Cafeteria	FT14-12x12 dark grey with white/pink/blue confetti floor tile	ND*
		Yellow glue associated with FT14	ND*
212	Cafeteria	FT15-12x12 dark brown with black confetti floor tile	NA/PS
		Light tan & black mastic associated with FT15	5% chrysotile
213	Hall 650	FT15-12x12 dark brown with black confetti floor tile	NA/PS
		Light tan & black mastic associated with FT15	NA/PS

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Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
214	Corridor 313C	FT16-12x12 light brown w/ dark brown and white confetti floor tile	NA/PS
		Black mastic associated with FT16	5% chrysotile
215	Room 314B	FT16-12x12 light brown w/ dark brown and white confetti floor tile	NA/PS
		Black mastic associated with FT16	NA/PS
216	Corridor 448	FT17A-12x12 teal confetti border floor tile	ND
217	Hall outside room 427	FT17A-12x12 teal confetti border floor tile	ND*
		Yellow glue (FT17A&B have same glue)	ND*
218	Hall outside room 414B	FT17B-12x12 cark cream confetti floor tile	ND
		Yellow glue (FT17A&B have same glue)	ND
219	Hall outside room 409	FT17B-12x12 cark cream confetti floor tile	ND*
220	Corridor 413	FT18-12x12 marble pattern floor tile	NA/PS
		Black mastic associated with FT18	5% chrysotile
221	Room 426	FT18-12x12 marble pattern floor tile	NA/PS
		Black mastic associated with FT18	NA/PS
222	Rec area 618	FT19-12x12 white with pink & blue confetti floor tile	ND
		Yellow glue associated with FT19	ND
223	Hall outside 7 th floor nurses station	FT19-12x12 white with pink & blue confetti floor tile	ND*
		Yellow glue associated with FT19	ND*
224	Hall outside room 648	FT20A-12x12 pink confetti border floor tile	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
225	Hall outside room 614A	FT20A-12x12 pink confetti border floor tile	ND*
		Yellow glue (FT20 A&B have the same glue)	ND*
226	6 th floor – outside exit to stair 1	FT20B-12x12 white w/ light grey confetti center floor tile	ND
		Yellow glue (FT20 A&B have the same glue)	ND
227	Hall outside room 614A	FT20B-12x12 white w/ light grey confetti center floor tile	ND*
228	8 th floor elevator lobby	FT21A-9x9 black w/ white streaks border tile	ND
229	Hall outside room 812	FT21A-9x9 black w/ white streaks border tile	ND*
		Yellow glue associated with FT21A	ND*
230	Hall outside room 812	FT21B-9x9 white w/ black streaks center tile	ND
		Yellow glue associated with FT21B	ND
231	8 th floor elevator lobby	FT21B-9x9 white w/ black streaks center tile	ND*
232	Hall outside room 812	FT22-12x12 maroon confetti (with some white confetti) floor tile	NA/PS
		Black mastic associated with FT22	5% chrysotile
233	Room 861	FT22-12x12 maroon confetti (with some white confetti) floor tile	NA/PS
		Black mastic associated with FT22	NA/PS
234	Hall outside room 827	FT24A-12x12 black with white confetti border floor tile	ND
235	Hall outside room 833	FT24A-12x12 black with white confetti border floor tile	ND*
		Yellow glue associated with FT24A	ND*

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
236	Room 827	FT24B-12x12 white confetti center floor tile	ND
		Yellow glue associated with FT24B	ND
237	Room 827	FT24B-12x12 white confetti center floor tile	ND*
238	Hall outside room 835	FT25-12x12 cream w/ grey confetti floor tile	ND
		Grey glue associated with FT25	ND
239	Hall outside room 835	FT25-12x12 cream w/ grey confetti floor tile	ND*
		Grey glue associated with FT25	ND*
240	Connector	FT26-12x12 tan confetti w/ "grip" texture floor tile	NA/PS
		Black mastic associated with FT26	5% chrysotile
241	Connector	FT26-12x12 tan confetti w/ "grip" texture floor tile	NA/PS
		Black mastic associated with FT26	NA/PS
242	Elevator	FT27-12x12 black with white confetti floor tile	NA/PS
		Black & tan mastic associated with FT27	3% chrysotile
243	Elevator	FT27-12x12 black with white confetti floor tile	NA/PS
		Black & tan mastic associated with FT27	NA/PS
244	Room 19	PL1 - tan basecoat plaster	ND
		White skimcoat	ND
245	Room 4	PL1 - tan basecoat plaster	ND
		White skimcoat	ND
246	Room 112	PL1 - tan basecoat plaster	ND
		White skimcoat	ND

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247	Room 158	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
248	Room 170	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
249	Room 120	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
250	Room 225	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
251	Room 241	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
252	Room 209	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
253	Room 234A	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
254	Hall outside 615B	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
255	Room 627	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
256	Hall outside room 630	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
257	Room 307	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
258	Room 337	PL1 – tan basecoat plaster	ND
		White skimcoat	ND

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259	Room 312	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
260	Corridor 316	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
261	Hall outside room 746	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
262	Hall outside room 748	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
263	Room 706	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
264	Room 718	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
265		PL1 – tan basecoat plaster	ND
		White skimcoat	ND
266		PL1 – tan basecoat plaster	ND
		White skimcoat	ND
267		PL1 – tan basecoat plaster	ND
		White skimcoat	ND
268	Room 418	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
269	Room 812	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
270	Room 819	PL1 – tan basecoat plaster	ND
		White skimcoat	ND

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Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
271	Room 826	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
272	Room 814	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
273	Room 855	PL1 – tan basecoat plaster	ND
		White skimcoat	ND
274	Room 232B	M1-blue glue	ND
275	2 nd floor	M1-blue glue	ND*
276	Room 255	M2-residual black mastic	5% chrysotile
277	Room 255	M2-residual black mastic	NA/PS
278	Room 630	RM1-black residual mastic	5% chrysotile
279	Room 619A	RM1-black residual mastic	NA/PS
280	Room 826	RM2-black residual mastic	5% chrysotile
281	Room 819	RM2-black residual mastic	NA/PS
282	Room 106A	CP1-brown brittle carpet backing	ND
283	Room 106A	CP1-brown brittle carpet backing	ND*
284	Pantry 737	WCU1-brown metal counter undercoating	20% chrysotile
285	Pantry 737	WCU1-brown metal counter undercoating	NA/PS
286	Room 312	SU1-light grey sink coating	ND
287	Room 312	SU1-light grey sink coating	ND*
288	Room 419	SU2-light purple sink undercoating	20% chrysotile
289	Room 419	SU2-light purple sink undercoating	NA/PS
290	Room 546	BFC1-brown floor coating with aggregate	ND

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Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
291	Room 546	BFC1-brown floor coating with aggregate	ND*
292	Room 312	S1-tan sink putty	ND
293	Room 312	S1-tan sink putty	ND*
294	4 th floor mech room	FC1-cloth flex connector	ND
295	8 th floor mech room	FC1-cloth flex connector	ND
296	4 th floor mech room	DW1-cloth/foil paper	ND
		Yellow glue duct covering (over fiberglass insulation)	ND
297	8 th floor mech room	DW1-cloth/foil paper	ND
		Yellow glue duct covering (over fiberglass insulation)	ND*
298	5 th floor mech room	DI2-mudded duct sealant on outside of fiberglass duct insulation on seam	80% chrysotile
299	4 th floor mech room	DM1-mudded duct insulation	ND
300	Room 14B	FW1- tin hanging firewall paper	ND
		Grey glue	ND
301	Room 106A	FW1- tin hanging firewall paper	ND
		Grey glue	ND*
302	3 rd floor connector	DW2- foil paper	ND
		Yellow glue duct covering	ND
303	3 rd floor connector	DW2- foil paper	ND
		Yellow glue duct covering	ND*
304	1 st floor Mech Room	PSS1 - white seam sealant on older fiberglass/PVC pipes	ND
305	1 st floor Mech Room	PSS1 - white seam sealant on older fiberglass/PVC pipes	ND

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306	Room 39	PSS2-white seam sealant on new fiberglass/PVC pipe insulation	ND
307	PC2	PSS2-white seam sealant on new fiberglass/PVC pipe insulation	ND
308	Corridor 163	WP1-cloth wall covering	ND
309	1 st floor mech room	DS1-light grey, sticky putty sealant between metal duct seams	ND
310	5 th floor mech room	DS1-light grey, sticky putty sealant between metal duct seams	ND*
311	6 th floor mech room	DS1-light grey, sticky putty sealant between metal duct seams	ND
312	5 th floor mech room	DS2-black putty sealant on duct unit	ND
313	6 th floor mech room	DS2-black putty sealant on duct unit	ND*
314	3 rd floor mech room	DS3-white seam sealant on outside of fiberglass duct insulation on seams	ND
315	4 th floor mech room	DS3-white seam sealant on outside of fiberglass duct insulation on seams	ND*
316	6 th floor mech room	DS3-white seam sealant on outside of fiberglass duct insulation on seams	ND
317	3 rd floor mech room	DS4-grey, hard duct sealant on corner seams of bare metal duct	ND
318	1 st floor mech room	DS4-grey, hard duct sealant on corner seams of bare metal duct	ND*
319	Room 39	DS5-grey, putty sealant in between duct seams	ND
320	Room 39	DS5-grey, putty sealant in between duct seams	ND*
321	Room 20	GR1-tan grout between 1.5" ceramic floor tile	ND
322	Room 20	GR1-tan grout between 1.5" ceramic floor tile	ND
323	Room 20	GR2-cream grout under 1.5" ceramic floor tile	ND

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324	Room 20	GR2-cream grout under 1.5" ceramic floor tile	ND
325	Stair 12	GR3-hard dark grey grout between large slate tiles	ND
326	Stair 12	GR3-hard dark grey grout between large slate tiles	ND
327	Room 106A	GR4A-white grout behind large slate wall tiles	ND
328	Room 106A	GR4A-white grout behind large slate wall tiles	ND
329	Room 106A	GR4B-dark grey grout behind large slate wall tiles	ND
330	Room 106A	GR4B-dark grey grout behind large slate wall tiles	ND
331	Serving 319	GR5-white grout between 4" ceramic wall tiles	ND
332	Serving 319	GR5-white grout between 4" ceramic wall tiles	ND
333	Room 46	C1-yelooow hard semi-flexible caulk	5% chrysotile
334	Room 4	C1-yelooow hard semi-flexible caulk	NA/PS
335	Room 43	C2-white flexible caulk	ND
336	Room 735	C2-white flexible caulk	ND*
337	Kitchen 318	C2-white flexible caulk	ND
338	Entry 113	C3-light grey sticky/tacky caulk	ND
339	Stairwell 12	C3-light grey sticky/tacky caulk	ND*
340	Stairwell 12	C4-hard grey caulk	ND
341	Stairwell 12	C4-hard grey caulk	ND*
342	8 th floor mech room	C5-tan semi flexible caulk	Trace chrysotile
343	4 th floor mech room	C5-tan semi flexible caulk	3.7% chrysotile*
344	4 th floor mech room	C6-grey putty-like caulk	ND

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345	8 th floor mech room	C6-grey putty-like caulk	1.7% chrysotile*
346	3 rd floor mech room	C7-tan flexible caulk	ND
347	7 th floor mech room	C7-tan flexible caulk	ND*
348	Room 25	C7A-grey tacky caulk	ND
349	Room 25	C7A-grey tacky caulk	ND*
350	Room 142	C9-grey sticky caulk	Trace chrysotile
351	Room 429	C9-grey sticky caulk	1.6% chrysotile*
352	Ground floor – mech room	MR1-mudded residual material	40% chrysotile
353	8 th floor – mech room	MR1A-mudded residual material	20% amosite
354	7 th floor – mech room	MR2-mudded residual on corner of fiberglass duct insulation	40% chrysotile
355	2 nd floor – mech room	MR3-mudded residual material	ND
356	Ground floor – mech room	EC1-mudded endcap/valvecap insulation	Trace chrysotile
357	Ground floor – mech room	EC1-mudded endcap/valvecap insulation	ND
358	Ground floor – mech room	EC1-mudded endcap/valvecap insulation	ND
359	Ground floor – room 51B	MD1-mudded insulation on fiberglass/PVC lines, endcaps & other areas	ND
360	Ground floor – mech room	MD1-mudded insulation on fiberglass/PVC lines, endcaps & other areas	ND
361	Ground floor – mech room	MD1-mudded insulation on fiberglass/PVC lines, endcaps & other areas	ND
362	Ground floor – mech room	MD1-mudded insulation on fiberglass/PVC lines, endcaps & other areas	ND
363	Ground floor – mech room	TI1-mudded tank endcap (top only)	ND
364	Ground floor – mech room	TI1-mudded tank endcap (top only)	ND

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365	Ground floor – mech room	TI1-mudded tank endcap (top only)	ND
366	8 th floor - mech room	TW1-black tar wrap on pipe	ND
367	7 th floor – mech room	TW1-black tar wrap on pipe	ND*
368	Room 4	CBG1-dark brown brittle cove base glue	ND
369	Stairwell 6	CBG1-dark brown brittle cove base glue	ND*
370	Room 205	CBG1-dark brown brittle cove base glue	ND
371	Room 612	CBG1-dark brown brittle cove base glue	ND
372	Ground floor – corridor 37	CBG2-cream cove base glue	ND
373	Room 4	CBG2-cream cove base glue	ND*
374	Corridor 6	CBG3-tan cove base glue	ND
375	Corridor 6	CBG3-tan cove base glue	ND*
376	Room 8	CBG4-grey cove base glue	ND
377	Room 25	CBG4-grey cove base glue	ND*
378	Room 14B	CBG5-cream cove base glue (renovated area)	ND
379	Room 14B	CBG5-cream cove base glue (renovated area)	ND*
380	Corridor 102	CBG6-clear, yellow sticky glue	ND
381	Room 231	CBG6-clear, yellow sticky glue	ND*
Partial Inspection of 5th Floor – February 02/15			
1	Lounge room 502	FT1 – 12x12 off-white w/ tan/white mottled floor tile	ND
		Orange glue associated with FT1	ND
2	Lounge room 502	FT1 – 12x12 off-white w/ tan/white mottled floor tile	ND*
		Orange glue associated with FT1	ND*

NA/PVA Not analyzed/positive via inseparable association with a confirmed positive ACM

NA/PS Not analyzed/positive stop, homogeneous to sample proven to contain asbestos

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**TABLE 1
BULK SAMPLE SUMMARY OF SUSPECT ASBESTOS CONTAINING MATERIALS
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
3	Office room 517	FT2 – tan glue associated with 3x3 grey rubber mat floor tile	ND
4	Day room 518A	FT2 – tan glue associated with 3x3 grey rubber mat floor tile	ND*
5	Meeting room 519A	FT3 – 12x12 green w/ light green mottled floor tile	10% chrysotile
		Black mastic associated with FT3	5% chrysotile
6	Dining room 535	FT3 – 12x12 green w/ light green mottled floor tile	NA/PS
		Black mastic associated with FT3	NA/PS
7	Office room 533	FT4 – 12x12 tan floor tile w/ white flakes	10% chrysotile
		Black mastic associated with FT4	5% chrysotile
8	Room 514	FT4 – 12x12 tan floor tile w/ white flakes	NA/PS
		Black mastic associated with FT4	NA/PS
9	Room 508	FT5 – 12x12 tan floor tile w/ white streaks	10% chrysotile
		Black mastic associated with FT5	5% chrysotile
10	Room 507	FT5 – 12x12 tan floor tile w/ white streaks	NA/PS
		Black mastic associated with FT5	NA/PS
11	Room 526	FT6 – 12x12 off-white floor tile w/ mottled tan flakes	ND
		Black mastic associated with FT6	3% chrysotile
12	Room 526	FT6 – 12x12 off-white floor tile w/ mottled tan flakes	ND
		Black mastic associated with FT6	NA/PS
13	Hallway 534	FT7 – 12x12 light/dark salmon floor tile	ND

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
			Black mastic associated with FT7
14	Hallway 534	FT7 – 12x12 light/dark salmon floor tile	ND
		Black mastic associated with FT7	NA/PS
15	Lounge 502	CT1 – 1x1 white long fissure spline ceiling tile	ND
16	Office 533	CT1 – 1x1 white long fissure spline ceiling tile	ND
17	Meeting room 519A	CT2 – 4x2 yellowish long fissure/pinhole ceiling tile, inset	ND
18	Room 508	CT2 – 4x2 yellowish long fissure/pinhole ceiling tile, inset	3% amosite
19	Dining room 535	CT3 – 2x2 white short fissure/pinhole ceiling tile, inset	ND
20	Room 526	CT3 – 2x2 white short fissure/pinhole ceiling tile, inset	ND
21	Lounge 502	SHR1 – light grey sheetrock	ND
		Off-white joint compound	ND
22	Dining room 535	SHR1 – light grey sheetrock	ND
		Off-white joint compound	ND
23	Lounge 502	G1 – tan covebase glue	ND
24	Office 517	G1 – tan covebase glue	ND*
25	Lounge 502	G2 – dark brown covebase glue	ND
26	Office 517	G2 – dark brown covebase glue	ND*
27	Lounge 502	DWG1 – grey sticky door window glaze	ND
28	Hall 534 o/s room 537	DWG1 – grey sticky door window glaze	ND*
29	Meeting room 519 A/B door	DWG2 – grey hard door window glaze	3% chrysotile
30	Meeting room 519 A/B door	DWG2 – grey hard door window glaze	NA/PS

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BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
31	Lounge 502	PL1 – tan plaster	ND
		White skimcoat	ND
32	Room 531	PL1 – tan plaster	ND
		White skimcoat	ND
33	Meeting room 519A	PL1 – tan plaster	ND
		White skimcoat	ND
34	Room 508	PL1 – tan plaster	ND
		White skimcoat	ND
35	Room 526	PL1 – tan plaster	ND
		White skimcoat	ND
36	Room 519	PL1 – tan plaster	ND
		White skimcoat	ND
37	Hallway 516 o/s room 525	PL1 – tan plaster	ND
		White skimcoat	ND
38	Lounge 502	FP1 – dark red fire penetration material	ND
39	Meeting room 519A	FP1 – dark red fire penetration material	ND*
40	Hallway 516	FP2 – light red w/ white dots fire penetration material	ND
41	Room 508	FP2 – light red w/ white dots fire penetration material	ND*
42	Hallway 516	FP3 – dark brown fire penetration material	ND
43	Men's 521/women's 522 chase	FP3 – dark brown fire penetration material	3.6% chrysotile*
44	Men's 521 chase	MF1 – light grey mudded fitting material	ND
45	Women's 522 chase	MF1 – light grey mudded fitting material	ND
46	Men's 559 chase	MF1 – light grey mudded fitting material	ND

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GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Sample No.	Sample Location	Type of Homogeneous Material	% and Type Asbestos
47	Meeting room 519A	SII – pink sink insulation	20% chrysotile
48	Meeting room 519A	SII – pink sink insulation	NA/PS
49	Men's room 522	GR1 – dark grey grout between and under ceramic floortile	ND
50	Men's room 559	GR1 – dark grey grout between and under ceramic floortile	ND
51	Men's room 522	GR2A – white grout between 4x4 ceramic wall tile	ND
52	Men's room 559	GR2A – white grout between 4x4 ceramic wall tile	ND
53	Men's room 522	GR2B – yellow grout under 4x4 ceramic wall tile	ND
54	Men's room 559	GR2B – yellow grout under 4x4 ceramic wall tile	ND
55	Dining room 535	WP1 – wallpaper	ND
		Tan wallpaper glue	ND
56	Lounge 502	WP1 – wallpaper	ND
		Tan wallpaper glue	ND
57	Dining room 535	WG1 – hard grey window glaze	3% chrysotile
58	Dining room 535	WG1 – hard grey window glaze	NA/PS
59	Office 533	FD1 – white fire door insulation	30% chrysotile
60	Bath 510	FD1 – white fire door insulation	NA/PS
61	Room 506	FD2 – pink fire door insulation	ND
62	Room 506	FD2 – pink fire door insulation	ND
63	Room 527	FD3 – brown fire door insulation	ND
64	Room 527	FD3 – brown fire door insulation	ND

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**TABLE 2
IDENTIFIED ASBESTOS CONTAINING MATERIALS (>1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
FD1-white insulation in wood fire door (weldwood composite – underwriter laboratories)	Sampled 11/15	Hallway doors to room 170, 149, 148, 147, 141, 140	Friable	Thermal System Insulation	8	6 EA
FD2 – white insulation in wood fire door with 6"x3' window	Sampled 11/15	Hallway doors to room 855, 755, 655, 555, 327, 250	Friable	Thermal System Insulation	8	6 EA
FD3-white insulation in 8' high wood double doors with 1'x4' window	Sampled 11/15	Hallway doors to room 802 (4 doors), 502 (4 doors),	Friable	Thermal System Insulation	8	8 EA
FD1 – white fire door insulation	Sampled 2/15*	Nurse 507, Office 526, Office 533, Bath 510	Friable	Miscellaneous	8	4 EA
Fire door insulation	Assumed 11/15	Throughout building	Friable	Thermal System Insulation	8	Unknown
DWG2 – soft gray, putty glaze on metal door window	Sampled 9/15	Corridors 37, 550, 750, Rooms 113, 247, 601	Category II Non-friable	Miscellaneous	8	12 EA
DWG3 – hard gray glaze on metal door mesh window	Sampled 9/15	Corridors 3 & 46, Rooms 415, 615 & 815	Category II Non-friable	Miscellaneous	8	8 EA
DWG2 – grey hard door window glaze	Sampled 2/15*	Meeting room 519 A/B door	Category II Non-friable	Miscellaneous	8	10 LF
MF2-light grey uncovered mudded fittings on fiberglass lines	Sampled 10/15	Throughout building (above ceilings, in pipe chases, wall cavities, mechanical rooms, etc.)	Friable	Thermal System Insulation	7	Unknown
Mudded fitting (MF2) debris in pipe chases	Sampled 10/15	Throughout all pipe chases	Friable	Thermal System Insulation	2	Unknown
Cloth wrapped mudded fittings on fiberglass insulated pipes (MF4, MF5, MF6)	Sampled 9/15	All mechanical rooms, room 32 and throughout building	Friable	Thermal System Insulation	2 (localized)	Unknown

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**TABLE 2
IDENTIFIED ASBESTOS CONTAINING MATERIALS (>1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
MF7-white uncovered mudded fitting on 6" OD fg line	Sampled 10/15	3 rd floor - Entry 337 & hospital connector	Friable	Thermal System Insulation	7	6 EA (2 in entry 337)
Mudded roof drains	Assumed 11/15	Throughout 8 th floor	Friable	Thermal System Insulation	7	Unknown
DI2-mudded duct sealant on outside of fiberglass duct insulation on seam	Sampled 9/15	5 th floor mech room	Friable	Thermal System Insulation	7	2 LF
MR1-mudded residual material	Sampled 9/15	Ground floor – mech room 44	Friable	TSI	2	1 SF
MR1A-mudded residual material	Sampled 9/15	8 th floor – mech room	Friable	TSI	2	1 SF
MR2-mudded residual on corner of fiberglass duct insulation	Sampled 9/15	Mech room 745	Friable	TSI	7	½ SF
Pipe gaskets	Assumed 11/15	Throughout mechanical rooms	Category I Non-friable	Miscellaneous	8	Unknown
WG1-hard grey brittle glaze on interior metal framed windows	Sampled 10/15 & 2/15*	Rooms 115, 137, 170, 207, 209, 238, 239, 305, 404, 417, 418, 433, 434, 509, 535, 635, 709, 809, 818, 825	Category II Non-friable	Miscellaneous	8	41 EA
WG2-dark grey putty window glaze	Sampled 9/15	Rooms 231, 228, 709 & 809	Category II Non-friable	Miscellaneous	8	4 EA
WG3-grey putty window glazing	Sampled 10/15	Throughout 7 th floor – upper windows (many above current ceilings)	Category II Non-friable	Miscellaneous	8	Unknown
WG4-grey hard glazing on interior of exterior windows (that don't open)	Sampled 11/15	Throughout Building	Category II Non-friable	Miscellaneous	8	Unknown

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IDENTIFIED ASBESTOS CONTAINING MATERIALS (>1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
WG5-dark grey window glazing on interior of exterior windows (that open)	Sampled 11/15	Throughout Building	Category II Non-friable	Miscellaneous	8	Unknown
G9-white glue under cloth sill	Sampled 11/15	3 rd floor – connector (under cloth on sill & potentially walls)	Category II Non-friable	Miscellaneous	8	500 SF +
C1-yellow hard semi-flexible caulk	Sampled 9/15	Corridors – 37 & 43, Rooms 4, 49, 50, 337, 426	Category II Non-friable	Miscellaneous	8	920 LF
C5-tan semi flexible caulk	Sampled 9/15	Mech room 442, 745 & 845	Category II Non-friable	Miscellaneous	8	70 LF
C6-grey putty-like caulk	Sampled 9/15	Mech rooms 442, 745 & 845	Category II Non-friable	Miscellaneous	8	35 LF
C9-grey sticky caulk	Sampled 11/15	Exterior – around all windows	Category II Non-friable	Miscellaneous	8	Unknown
FS1-brown putty fire stop (FP3-2/15)	Sampled 9/15 & 2/15*	Throughout building – potentially at all pipe/conduit/etc. penetrations	Category II Non-friable	Miscellaneous	8	Unknown
SU2-light purple sink undercoating	Sampled 10/15	Rooms 419, 546, 746 & 819A	Category II Non-friable	Miscellaneous	8	4 EA
Sink undercoating	Assumed 11/15	Room 537	Category II Non-friable	Miscellaneous	8	1 EA
SI1 – pink sink insulation	Sampled 2/15*	Meeting room 519A	Category II Non-friable	Miscellaneous	8	1 EA
FT1-12x12 multi-color cream confetti floor tile & residual black mastic	Sampled 9/15	Room 7	Category I Non-friable	Miscellaneous	8	300 SF

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IDENTIFIED ASBESTOS CONTAINING MATERIALS (>1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
FT2-12x12 cream floor tile and associated yellow & black mastic	Sampled 9/15	Room 8 and 9	Category I Non-friable	Miscellaneous	8	300 SF
FT3A-12x12 green w/ light green mottled (confetti) floor tile & associated black mastic	Sampled 2/15*	Corridors 534, 536, 550, 736 & 750, Elevator lobby 501 & 701, Rooms 519A&B, 527, 535, 543, 554, 555 & 743	Category I Non-friable	Miscellaneous	8	3,227 SF
FT4A-12x12 tan with white confetti floor tile & associated black mastic	Sampled 2/15* & 9/15	Rooms 107, 108, 110, 111, 115, 117, 124, 125, 127, 147-150, 164, 169, 170, 173, 511, 513, 514, 525, 528-533, 538-540, 548, 549, 606-609, 611, 612, 613A&B, 614A&B, 625, 626, 631, 638-640, 648, 649, 738-740, 743	Category I Non-friable	Miscellaneous	8	9,926 SF
FT5A-12x12 tan floor tile w/white streaks & associated black mastic	Sampled 2/15*	Corridors 6, 31 & 43, Rooms 10, 11, 35-37, 306-308, 334-336, 506-509, 512, 560, 709 812 & 860	Category I Non-friable	Miscellaneous	8	4,794 SF
FT5-12x12 light beige confetti floor tile and associated tan and residual black mastic	Sampled 9/15	Rooms 16-19, 25, 38, 39, 112, 135, 136B, 137, 139-143, 208, 227, 228, 231-233, 234A, 235A&B, 238, 249, 250, 245B, 246, 254, 705, 712 & 805	Category I Non-friable	Miscellaneous	8	7,170 SF

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IDENTIFIED ASBESTOS-CONTAINING MATERIALS (>1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
FT6-12x12 light tan w. small brown & white flecks floor tile & associated amber glue	Sampled 9/15	Room 103 & Room 112 (residual mastic only -under floor tile)	Category I Non-friable	Miscellaneous	8	108 SF
FT9-12x12 grey with heavy white streaks floor tile & associated black mastic	Sampled 9/15	Room 205 & 809	Category I Non-friable	Miscellaneous	8	264 SF
FT11-12x12 dark tan with dark & light tan streaks floor tile & associated black mastic	Sampled 9/15	Rooms 225, 226, 239, 241, 452, 453, 854 & 855	Category I Non-friable	Miscellaneous	8	2,216 SF
FT12-12x12 green with small black and white flecks floor tile & associated black mastic	Sampled 9/15	Rooms 211, 212, 214 & 256	Category I Non-friable	Miscellaneous	8	972 SF
FT13-12x12 light brown floor tile & associated black mastic	Sampled 10/15	Room 213	Category I Non-friable	Miscellaneous	8	252 SF
FT15-12x12 dark brown with black confetti floor tile and associated light tan & black mastic	Sampled 10/15	Cafeteria areas 329A-C (bottom layer), Corridors 316, 325, 332, 338, 601, 636 & 650, Elevator lobby 301, Rooms 327, 328A, 329D, 337, 627, 643 & 661	Category I Non-friable	Miscellaneous	8	5,571 SF
FT16-12x12 light brown w/ dark brown and white confetti floor tile & associated black mastic	Sampled 10/15	Cafeteria office & serving area 319 (bottom layer), Rooms 313A-C, 314A-C,	Category I Non-friable	Miscellaneous	8	1,965 SF

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GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
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Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
FT18-12x12 marble pattern floor tile & associated black mastic	Sampled 10/15	Corridor 413, Rooms 206, 207, 209, 405-408, 413A-C, 414A-C, 418, 419, 425B&C, 426-432, 417-419, 433-439, 445-447, 454, 457, 561	Category I Non-friable	Miscellaneous	8	6,709 SF
FT22-12x12 maroon confetti (with some white confetti) floor tile & associated black mastic	Sampled 10/15	Corridors 816 & 850, Elevator lobby 801, Room 861	Category I Non-friable	Miscellaneous	8	1,386 SF
FT26-12x12 tan confetti w/ "grip" texture floor tile & associated black mastic	Sampled 11/15	3 rd Floor Connector (to Hospital)	Category I Non-friable	Miscellaneous	8	216 SF
FT27-12x12 black with white confetti floor tile and associated black & tan mastic	Sampled 11/15	Elevators	Category I Non-friable	Miscellaneous	8	48 SF
Black mastic associated with 12x12 off-white floor tile w/ mottled tan flakes (FT6)*	Sampled 2/15*	Room 503, Room 504, Corridor 516, Room 526, Corridor 534	Category I Non-friable	Miscellaneous	8	900 SF
Black mastic associated with 12x12 light/dark salmon floor tile (FT7)*	Sampled 2/15*	Balcony 515, Corridor 516, Corridor 524, Hallway 534	Category I Non-friable	Miscellaneous	8	1,080 SF
M2-residual black mastic	Sampled 9/15	Rooms 106 (under carpet), 255 (under floor tile)	Category I Non-friable	Miscellaneous	8	400 SF
RM1-black residual mastic	Sampled 10/15	Room 619A&B, 628-630 & 632	Category I Non-friable	Miscellaneous	8	1,152 SF
RM2-black residual mastic	Sampled 11/15	Rooms 806-808, 813A&B, 814, 817, 818, 819A&B, 825, 826, 841 & 862,	Category I Non-friable	Miscellaneous	8	3,492 SF

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GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
Residual black mastic	Assumed 9/15	Throughout building – under carpet or tiles (<i>in any areas which were not previously sampled</i>)	Category I Non-friable	Miscellaneous	8	Unknown
WCU1-brown metal counter undercoating	Sampled 10/15	Pantry 537, 637, 737, 837	Category II Non-friable	Miscellaneous	8	300 SF
Mirror glue daubs	Assumed 11/15	Throughout bathrooms, Room 34	Category II Non-friable	Miscellaneous	8	13 EA
Wall panel glue	Assumed 11/15	Room 20 (250 SF), 136B (40 SF),	Category II Non-friable	Miscellaneous	8	290 SF
Electrical panel components	Assumed 11/15	Room 51B, Mech Room 845	Category II Non-friable	Miscellaneous	8	60 SF
Bulletin board/marker board glue daubs	Assumed 11/15	Corridors 404, 408, 416, Rooms 101, 124, 601, 818, 825 & 826	Category II Non-friable	Miscellaneous	8	12 EA
Interior metal wall panel components	Assumed 11/15	Rooms 114, 124 & 125	Category II Non-friable	Miscellaneous	8	400 SF
Glue/grout associated with ceramic wall/floor tiles	Assumed 11/15	Room 167	Category II Non-friable	Miscellaneous	8	380 SF
Insulation/sealant on underside of serving area	Assumed 11/15	Serving 319	Category II Non-friable	Miscellaneous	8	100 SF
Insulation/sealant on underside of dishwashing area	Assumed 11/15	Room 342	Category II Non-friable	Miscellaneous	8	50 SF
Insulation/sealant in wall/floor/ceiling of refrigerator units	Assumed 11/15	Foyer 346 - refrigerators	Category II Non-friable	Miscellaneous	8	680 SF

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**TABLE 2
IDENTIFIED ASBESTOS CONTAINING MATERIALS (>1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	Sampled/ Assumed (mo/yr)	General Location	NESHAP Category	AHERA Category	EPA Response Action	Estimated Quantity
Counter backsplash glue	Assumed 11/15	Room 419	Category II Non-friable	Miscellaneous	8	50 SF
Glue behind carpet pin boards on walls	Assumed 11/15	Room 618	Category II Non-friable	Miscellaneous	8	340 SF
2'x4' and 2'x2' white long squiggly w/ pinholes and red back ceiling tile (some tiles have vent openings) (CT2A, CT2 (2/15))	Sampled 11/15 & 2/15*	Corridor 6, 31, 37, 43, 114, 144, 146, 165, 216, 221, 224, 240, 247, 325, 332, 337, 338, 416, 423, 424, 440, 448, 516, 524, 532, 536, 550, 636, 650 3 rd floor-connector Room 29, 30, 106, 115, 117, 124, 125, 126A&B, 127, 151, 158-163, 164, 169, 170, 201, 205-214, 217, 219, 225, 227, 231, 233, 238, 245B, 254-256, 303-306, 308, 313A-C, 314A- C, 334, 336, 403- 408, 413A-C, 414A- C, 418, 419, 428- 438, 445-447, 457, 503, 504, 506-508, 519A, 527, 560, 562 605-607, 609, 612, 626, 660, 705, 709, 712, 806-808, 860	Category II Non-friable	Miscellaneous	6	27, 606 SF

Tan skimcoat associated with SHR4 in Room 802 on the 8th floor was found to contain Trace levels of Chrysotile (<1%). Although not a Regulated Asbestos-Containing Material, OSHA regulations would apply if the material is impacted as part of any renovation or demolition activities.

AHERA Categories = thermal system insulation (TSI), surfacing material or miscellaneous
 NESHAP Categories = friable, category I non-friable or category II non-friable
 Friable = crumbled, pulverized or reduced to powder by hand pressure when dry
 Category I Non-friable = packings, gaskets, resilient floor covering and asphalt roofing
 Category II Non-friable = all non-friable that is not Category I

**TABLE 3
 CONFIRMED NON-ASBESTOS CONTAINING MATERIALS (<1%)
 GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
 BRIDGEPORT, CONNECTICUT**

Material
VB1 – black, paper/tar floor vapor barrier
FD4-tan/red corrugated paper insulation in metal fire door with 1’x1’ window
DWG1 – soft gray, putty glaze on wood door window
DWG4 – black putty glazing on metal door window glaze
DWG5- black putty glazing on metal door window
MF1-light grey mudded fittings
Roof drain fitting
MF3 – cloth wrapped on 7” OD fg line
MF5 – 6” OD MF on uninsulated line
MF6 – 4”+6” OD fg lines with cloth covered MFs
CT1A – 1x1 white spline w/long squiggles ceiling tile (some have vents)
CT2A – 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
CT3A – 2x2 comma, pinhole ceiling tile
CT1-2x2 long squiggly/pinhole/dot w/ vent, red back ceiling tiles
CT2 – 2x2 wormhole/pinhole ceiling tile (some have vents)
CT3 – 2x4 comma pinhole ceiling tile
CT5 – 2x4 busy wormhole/pinhole
CT2A – 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
CT7-2x4 wormhole pinhole ceiling tile
CT8-1x1 splined wormhole/divot ceiling tile (replacement)
CT9 - 1x1 white spline w/long squiggles ceiling tile (no red back)
CT10-2x2 sheetrock ceiling tile
CT11-2x2 mountainous texture multisize pinhole ceiling tile
CG1-blue sticky carpet glue
CG2-sticky yellow carpet glue
CG3-brittle yellow carpet glue
G1-residual yellow creamish carpet glue
G2-yellow glue under fiberglass associated w/DW1 (between fg/metal)
G3-grey glue behind Styrofoam insulation behind electric base heater
G4-light cream/grey glue under foil fiberglass duct insulation
G5-cream glue behind 4”x4” ceramic wall tile
G6-cream glue behind sheetrock on column
G7-soft flexible glue under yellow Styrofoam on backside of upper windows
G8-tan flexible glue daubs behind blue Styrofoam on upper walls
FS2-red flexible fire stop
FS3-crumbly, brick colored firestop
FS5-brown flexible firestop
FS6-pliable light red w/ white spots fire stop
SHR1-light grey sheetrock/white joint compound
SHR2-light grey sheetrock – 1” thick (backing in bathroom wall) (no JC)
SHR2A-light grey sheetrock/skimcoat

**TABLE 3
 CONFIRMED NON-ASBESTOS CONTAINING MATERIALS (<1%)
 GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
 BRIDGEPORT, CONNECTICUT**

Material
SHR3-light grey sheetrock (no jc) associated with wall panels
SHR4-light grey sheetrock/tan skimcoat**
FT3-12x12 white confetti floor tile & associated grey glue
FT4-tan floor tile (remnants only) & associated yellow glue
FT5B-12x12 light beige confetti floor tile & associated yellow mastic
FT5C-12x12 lighter beige confetti floor tile & associated yellow mastic
FT7A-12x12 yellow confetti floor tile & associated yellow glue
FT7B-12x12 dark grey confetti floor tile & associated yellow glue
FT10-12x12 tan with maroon streaks floor tile & associated yellow glue
FT14-12x12 dark grey with white/pink/blue confetti floor tile & associated yellow glue
FT17A-12x12 teal confetti border floor tile & associated yellow glue
FT17B-12x12 cark cream confetti floor tile & associated yellow glue
FT19-12x12 white with pink & blue confetti floor tile & associated yellow glue
FT20A-12x12 pink confetti border floor tile & associated yellow glue
FT20B-12x12 white w/ light grey confetti center floor tile & associated yellow glue
FT21A-9x9 black w/ white streaks border tile & associated yellow glue
FT21B-9x9 white w/ black streaks center tile & associated yellow glue
FT24A-12x12 black with white confetti border floor tile & associated yellow glue
FT24B-12x12 white confetti center floor tile & associated yellow glue
FT25-12x12 cream w/ grey confetti floor tile & associated grey glue
PL1 - tan basecoat plaster/white skimcoat
M1-blue glue
CP1-brown brittle carpet backing
SU1-light grey sink coating
BFC1-brown floor coating with aggregate
S1-tan sink putty
FC1-cloth flex connector
DW1-cloth/foil paper & associated yellow glue duct covering (over fiberglass insulation)
DM1-mudded duct insulation
FW1- tin hanging firewall paper & associated grey glue
DW2- foil paper & associated yellow glue duct covering
PSS1 - white seam sealant on older fiberglass/PVC pipes
PSS2-white seam sealant on neew fiberglass/PVC pipe insulation
WP1-cloth wall covering
DS1-light grey, sticky putty sealant between metal duct seams
DS2-black putty sealant on duct unit
DS3-white seam sealant on outside of fiberglass duct insulation on seams
DS4-grey, hard duct sealant on corner seams of bare metal duct
DS5-grey, putty sealant in between duct seams
GR1-tan grout between 1.5" ceramic floor tile
GR2-cream grout under 1.5" ceramic floor tile

TABLE 3
CONFIRMED NON-ASBESTOS CONTAINING MATERIALS (<1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT

Material
GR3-hard dark grey grout between large slate tiles
GR4A-white grout behind large slate wall tiles
GR4B-dark grey grout behind large slate wall tiles
GR5-white grout between 4" ceramic wall tiles
C2-white flexible caulk
C3-light grey sticky/tacky caulk
C4-hard grey caulk
C7-tan flexible caulk
C7A-grey tacky caulk
MR3-mudded residual material
EC1-mudded endcap/valvecap insulation
MD1-mudded insulation on fiberglass/PVC lines, endcaps & other areas
TI1-mudded tank endcap (top only)
TW1-black tar wrap on pipe
CBG1-dark brown brittle cove base glue
CBG2-cream cove base glue
CBG3-tan cove base glue
CBG4-grey cove base glue
CBG5-cream cove base glue (renovated area)
CBG6-clear, yellow sticky glue
February 2015 - Partial Inspection of 5th Floor
FT1 - 12x12 off-white w/ tan/white mottled floor tile & associated orange glue
FT2 - tan glue associated with 3x3 grey rubber mat floor tile
FT6 - 12x12 off-white floor tile w/ mottled tan flakes*
FT7 - 12x12 light/dark salmon floor tile*
CT1 - 1x1 white long fissure spline ceiling tile
CT3 - 2x2 white short fissure/pinhole ceiling tile, inset
SHR1 - light grey sheetrock/off-white joint compound
G1 - tan covebase glue
G2 - dark brown covebase glue
DWG1 - grey sticky door window glaze
PL1 - tan plaster/white skimcoat
FP1 - dark red fire penetration material
FP2 - light red w/ white dots fire penetration material
MF1 - light grey mudded fitting material
GR1 - dark grey grout between and under ceramic floor tile
GR2A - white grout between 4x4 ceramic wall tile
GR2B - yellow grout under 4x4 ceramic wall tile
WP1 - wallpaper/tan wallpaper glue
FD2 - pink fire door insulation

**TABLE 3
CONFIRMED NON-ASBESTOS CONTAINING MATERIALS (<1%)
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material
FD3 – brown fire door insulation

* However, associated layers are positive.

** Tan skimcoat associated with SHR4 was found to contain Trace levels of Chrysotile (<1%). Although not a Regulated Asbestos-Containing Material, OSHA regulations would apply if the material is impacted as part of any renovation or demolition activities.

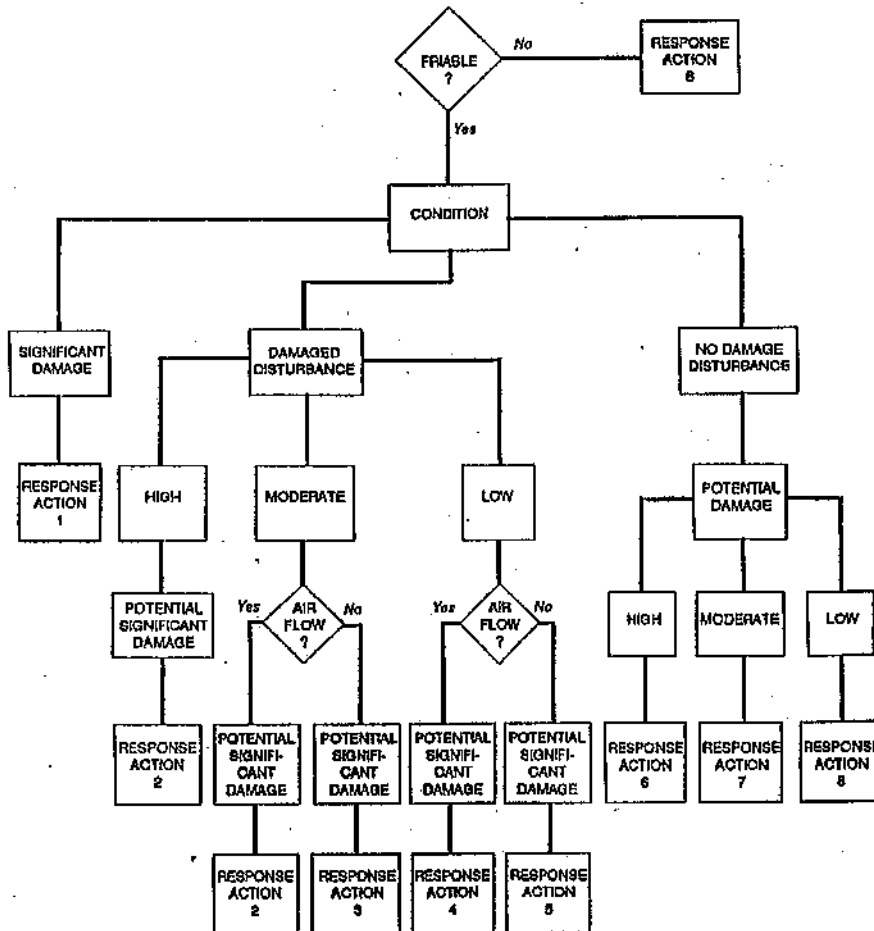
**TABLE 4
RECOMMENDED RESPONSE ACTIONS
GREATER BRIDGEPORT COMMUNITY MENTAL HEALTH CENTER
BRIDGEPORT, CONNECTICUT**

Material	General Location	Response Action Options
Mudded fitting (MF2) debris in pipe chases	Presumed throughout all pipe chases	<ol style="list-style-type: none"> 1. Repair or abate all defective mudding fittings and clean pipe chases. 2. Sample individual defective mudded fittings. Then follow Response Action #1 if ACM is identified. 3. Restrict access to pipe chases for appropriately trained personnel only. Post signs at all entrances.
Cloth wrapped mudded fittings on fiberglass insulated pipes (MF4, MF5, MF6)	Ground floor – Mechanical Room 44 (1 SF of debris on floor/pipes)	<ol style="list-style-type: none"> 1. Repair or abate defective mudded fittings and clean up debris.
MR1-mudded residual material	Ground floor – Mechanical Room 44 (1 SF of debris on top of EC1)	<ol style="list-style-type: none"> 1. Repair or abate defective mudded fittings and clean up debris.
MR1A-mudded residual material	8 th floor – Mechanical Room 845 (1 SF of debris)	<ol style="list-style-type: none"> 1. Repair or abate defective mudded fittings and clean up debris.

AHERA Categories = Thermal System Insulation (TSI), Surfacing material or Miscellaneous
 NESHAP Categories = Friable, Category I Non-friable or Category II Non-friable
 Friable = crumbled, pulverized or reduced to powder by hand pressure when dry
 Category I Non-friable = packings, gaskets, resilient floor covering and asphalt roofing
 Category II Non-friable = all non-friable that is not Category I

* refer to attached EPA Decision Tree and Response Action Key

EPA DECISION TREE AND RESPONSE ACTION KEY



RESPONSE ACTIONS KEY:

1. Isolate area and restrict access. Remove as soon as possible.
2. Implement O&M. Remove as soon as possible or reduce potential for disturbance.
3. Implement O&M. Schedule removal when practical and cost-effective, or reduce disturbance.
- 4-5. Implement O&M. Schedule removal when practical and cost-effective. Number indicates priority for removal.
- 6-7. Implement O&M. Take preventive measures to reduce disturbance. Number indicates priority for removal.
8. Implement O&M until major renovation or demolition requires removal under NESHAPS or until hazard assessment factors change.

Reference: Keyes, D., B. Price, and J. Chesson. *Guidance for Assessing and Managing Exposure to Asbestos in Buildings*. Draft. November 7, 1986. Section 2 (pp. 5-22), Section 3 (pp. 24-40), and Trees, p. 26 and 39.

4.0 HAZARD COMMUNICATION REQUIREMENTS

4.1 Identification

In accordance with OSHA 1910.1001(j)(1), employers and building owners are required to treat thermal system insulation (TSI) and sprayed on and trowel-on surfacing materials installed prior to 1980 as "presumed ACM or PACM". Asphalt and vinyl flooring material installed no later than 1980 must also be treated as PACM. The employer or building owner may demonstrate that PACM does not contain asbestos through bulk sampling/analysis conducted by a Certified Asbestos Inspector in accordance with EPA AHERA requirements (40 CFR 763). Further, building owners are required to exercise due diligence in the identification of any other materials which may be ACM.

4.2 Signs and Labeling

In accordance with OSHA 29 CFR 1910.1001(j) and OSHA 29 CFR 1926.1101(k) the building or facility owner shall identify previously installed ACM and/or PACM through the use of labels or signs affixed or posted so that employees will be notified of what materials contain ACM, and shall be placed in areas where they will be clearly noticed by employees who are likely to be exposed.

In accordance with OSHA 1910.1001(j)(3)(v) and OSHA 29 CFR 1926.1101(k)(6) at the entrance to mechanical rooms/areas in which employees can be expected to enter and which contain ACM/PACM, signs shall be posted which identify the material present, its location and work practices which, if followed, ensure that ACM/PACM will not be disturbed. An example of such a sign is included in **Appendix D**.

In accordance with OSHA 1910.1001(j)(4) and OSHA 29 CFR 1926.1101(k)(8) labels shall be affixed to asbestos containing materials or signs shall be posted so that employees will be notified of what materials in the facility contain ACM/PACM. Such labels shall be attached in areas where they will be clearly noticed. Labels shall include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

*Signs may be posted in lieu of labels so long as they contain the information required for labeling. An example of such a label is included in **Appendix E**.*

4.3 Notification

In accordance with the current OSHA general industry regulation 29 CFR 1910.1001(j)(2)(iii), the building or facility owner (through the Facility's Asbestos Manager) shall notify employers of employees, and employers shall notify employees who will perform housekeeping activities in areas which contain ACM/PACM of the presence and location of such material which may be contacted during such activities.

Before any construction activity is begun, in accordance with the current OSHA construction industry regulation 29 CFR 1926.1101(k)(2)(ii), the building or facility owner (through the Facility's Asbestos Manager) shall notify the following persons of the presence, location and quantity of ACM or presumed asbestos containing materials (PACM) at the work sites in their buildings and facilities. Notification shall be in writing or shall consist of a personal communication between the facility owner and the person to whom notification must be given or their authorized representative:

- i. Prospective employers applying or bidding for work whose employees reasonably can be expected to work in or adjacent to areas containing such material;
- ii. GBCMHC employees who will work in or adjacent to areas containing such material.
- iii. On multi-employer work sites, employers of employees who will be performing work within or adjacent to areas containing such materials;
- iv. Tenants who will occupy areas containing such material.

Sample notification letters are attached in **Appendix F**.

4.4 Training

Maintenance and custodial personnel/employees (inmates/prisoners excluded) who perform housekeeping activities in areas which contain ACM shall receive Asbestos Hazard Awareness Training in compliance with OSHA 29 CFR 1910.1001(j)(7)(iv) General Industry standards in order to perform such housekeeping activities. An annual refresher is required.

Any employee exposed to airborne asbestos at or above the TWA PEL or the excursion limit shall also receive training in compliance with OSHA 1910.1001(j)(7)(i)-(iii) General Industry Standards.

The Facility's Asbestos Manager shall also receive proper training to fulfill his/her duties in the administration of this O&M Plan.

Documentation of employee training shall be kept and inserted into this O&M Plan. See **Appendix G**.

4.5 Recordkeeping

The employer or building owner shall keep a copy of documentation related to the OSHA Asbestos Hazard Communication Standard (29 CFR 1910.1001) including the following:

- Asbestos Building Inspections and Bulk Sampling Data
- Signs and Labels
- Employee Notification Letters
- Building Occupant Notification Letters
- Notifications to Outside Contractors/Contractor Acknowledgment Forms
- Employee Asbestos Hazard Awareness Training Forms
- Minor Housekeeping Clean-up Documentation
- Regulatory Agency Correspondences

5.0 OPERATIONS AND MAINTENANCE WORK PRACTICES

5.1 Periodic Surveillances

5.1.1 Surveillance

It will be policy that periodic surveillance of areas of the building containing confirmed ACM/PACM shall be conducted. Surveillance may be conducted by an individual who has had initial asbestos awareness training, under the supervision of the Facility's Asbestos Manager.

The person performing periodic surveillance shall visually inspect materials identified in the survey report as ACM and note any changes in the physical condition of the materials, recording information on a Periodic Surveillance Form.

Periodically a complete re-inspection of the identified ACM may be conducted by an accredited inspector (certified EPA AHERA inspector). This complete re-inspection would reevaluate the assessment of the known ACM, its quantities and locations, and seek to identify previously unidentified suspect ACM. Additional material bulk sampling would be conducted on any newly identified suspect ACM which has not previously been sampled to determine asbestos content.

5.1.2 Reporting

Periodic surveillance results shall be recorded on a Periodic Surveillance Form, a sample of which is attached (**Appendix H**).

Reporting of identified damage noted by employees between routine periodic surveillances shall be encouraged and promoted. Reports of damage shall be submitted to the Facility's Asbestos Manager for further investigation.

Consultant's re-inspection results shall be documented as an addendum to the existing Investigative Survey and O&M Plan, and the O&M Plan shall be so updated as necessary under the supervision of the Facility's Asbestos Manager.

5.1.3 Response Actions

If ACM damage is observed during any periodic surveillance (or otherwise noted), the Facility's Asbestos Manager shall be immediately notified. The Facility's Asbestos Manager shall then take the proper steps to assess the situation, isolate the areas (if necessary), confer with the proper qualified and/or licensed asbestos consultant/abatement personnel, and then have the proper personnel abate/spot repair/clean the damage in a timely and cost effective manner which protects the health of the building occupants.

5.2 Housekeeping Activities

5.2.1 Routine Building Cleaning

Employees who perform housekeeping operations in an area which contains ACM/PACM shall be made aware of the presence of asbestos materials and the proper cleaning and decontamination procedures to be followed in the event minor contamination is suspected. Routine housekeeping may be performed by in-house personnel/employees only, properly trained with asbestos awareness training following the guidelines set forth in this plan.

In buildings with exposed asbestos containing materials, the following methods of housekeeping shall be used to maintain surfaces as free as practicable of asbestos contamination and prevent asbestos exposure during routine cleaning:

1. Only HEPA filtered vacuums shall be used when vacuum cleaning around friable ACM in mechanical rooms, boiler rooms etc.
2. Asbestos shall not be dry swept or picked up off of surfaces. If HEPA vacuuming is not employed, use spray bottles with water and surfactant agents to pre-wet the suspect debris or dust. Then clean up with standard mops or cleaning cloths. The mop heads and cloths shall be wetted and properly disposed of as asbestos waste.
3. Waste contaminated with ACM shall be disposed of in impermeable containers.

4. Care of ACM flooring shall be consistent with those prohibited activities listed in Section 5.2.2 and EPA guidance referenced in Section 2.0.

5.2.2 Prohibited Activities

At no time shall in-place ACM be intentionally disturbed by in-house employees.

Dry sweeping and/or non-HEPA equipped vacuuming of suspect ACM debris is prohibited.

The sanding of asbestos containing floor tile as well as the stripping, burnishing or dry buffing of unwaxed or unfinished flooring is prohibited. Stripping of finishes shall be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods.

Employee rotation as a means of reducing employee exposure to asbestos shall not be implemented.

5.3 Work Practices and Procedures

It will be the policy of GBCMHC that asbestos abatement related work shall be performed by an CTDPH licensed, qualified contractor with demonstrated prior experience in the field, using properly trained and licensed personnel. The work shall be accomplished according to the state and federal regulations. Only in house personnel with asbestos awareness training shall undertake in any *intentional* disturbance of ACM. Periodic visual surveillance and housekeeping actions may be undertaken by appropriately trained in-house personnel, in accordance with the policies and procedures listed within this plan, in order to provide for the greatest degree of safety from exposure to airborne asbestos fibers achievable.

Any questions, requests, hazard recognition or other correspondence related to asbestos containing materials shall be directed, through proper departmental channels, to the Facility's Asbestos Manager as soon as possible.

Any additional suspect materials not specifically covered in the survey report or O&M plan shall be referred to the Facility's Asbestos Manager for evaluation prior to any work impacting such. This material shall be considered asbestos containing until bulk sample analysis proves otherwise.

Any maintenance or renovation/demolition/construction work will be reviewed by the Facility's Asbestos Manager before it begins to determine if the operation may inadvertently impact ACM in the vicinity. If there is a possibility of ACM disturbance, the Facility's Asbestos Manager will have properly trained abatement professionals brought in to abate the interfering asbestos so that maintenance or renovation/demolition/etc. can be performed without any disturbance.

General contractors not trained and licensed as asbestos contractors, and without appropriate "asbestos abatement" insurance, shall not disturb any ACM.

Contractors shall follow appropriate federal, state and municipal regulations and guidelines during any asbestos related work.

Personnel conducting the clean-up, repair, encapsulation, enclosure or removal of ACM shall be adequately trained and if required appropriately licensed for such work. Contractors must demonstrate prior experience of the company and individuals in asbestos abatement work.

Requirements and policies of the in-house asbestos O&M program shall always apply at minimum. The general and specific requirements of the State of Connecticut, OSHA and EPA standards will be followed for any removal, encapsulation, enclosure, renovation, repair or demolition of ACM. Since asbestos related work has a potential for creating a hazardous exposure to asbestos fibers, the following steps shall be taken to minimize this potential.

- If an employee or contractor's work is not directly related to asbestos, every effort must be made to avoid damage or disturbance of asbestos containing materials.
- Any occurrence involving the damage or disturbance of ACM shall be reported promptly to the Facility's Asbestos Manager. The contractor, his employees, and other occupants shall leave the area and access will be denied until the Facility's Asbestos Manager informs occupants of procedures to be implemented.

No ACM shall be sawed, sanded, drilled or otherwise worked on to facilitate other work. This would apply to drilling through asbestos floor tiles, for example.

5.4 Abatement Contractor Training/Licensing

It will be the policy of GBCMHC that asbestos abatement related work shall be performed by a licensed, qualified contractor with demonstrated prior experience in the field, using properly trained and certified personnel. The work shall be accomplished according to the state and federal regulations.

Any entity engaged in asbestos abatement related work involving greater than three (3) square or linear feet must hold an Asbestos Abatement Contractor's license as required by CTDPH 340-248-0120.

Employees of outside contractors that perform abatement activities on greater than three (3) square or linear feet of ACM will receive a minimum of 32 hours of EPA approved

training as required by the CTDPH 340-248-0130(4), in compliance with Class I and/or Class II OSHA 29CFR 1926.1101(k)(9) training requirements and in accordance with EPA Model Accreditation Plan 40 CFR Part 763, Appendix C to Subpart E, Level 3 training. Such persons shall also possess a valid State of Connecticut Asbestos Abatement Worker Certification in accordance with CTDPH 340-248-0130(5-10).

Any employee of outside contractors acting as a supervisor during abatement activities of greater than three (3) square or linear feet will receive an additional eight (8) hours of Supervisor/Foreman training as required by the CTDPH 240-248-0130(3) in compliance with Class I and/or Class II OSHA 29CFR 1926.1101(k)(9) training requirements and in accordance with EPA Model Accreditation Plan 40 CFR Part 763, Appendix C to Subpart E, Level 3 training. Such persons shall also possess a valid State of Connecticut Asbestos Abatement Supervisor Certification in accordance with CTDPH 240-248-0130(5-10).

Any employees of outside contractors that perform spot repair or O&M work practices on less than three (3) square or linear feet of ACM will receive sixteen (16) hours of Asbestos Associated Project Workers training in compliance with Class III OSHA 29 CFR 1926.1101(k)(9) training requirements and in accordance with EPA 40 CFR 763.92(a)(2), Level 2 training.

Employees of outside contractors who will perform housekeeping activities related to construction activity shall receive, 2-hr Asbestos Awareness Training in compliance with Class IV OSHA 29 CFR 1926.1101(k)(9) training requirements and in accordance with EPA 40 CFR 763.92(a)(1), Level 1 training.

5.5 Emergency Response

The following procedures shall be followed when asbestos is accidentally disturbed or unexpectedly encountered during routine housekeeping, maintenance, construction, renovation or demolition work.

5.5.1 General

Work shall stop and the affected area immediately restricted to establish an isolated area.

The responsible area Maintenance Supervisor and Facility's Asbestos Manager shall be immediately notified.

Environmental air samples may be collected by certified personnel to document air quality conditions.

The HVAC system may be modified where possible to prevent the migration of airborne asbestos fibers to other areas of the building.

5.5.2 Housekeeping

If the Facility's Asbestos Manager recognizes *only a minor housekeeping situation*, corrective measures shall be under taken following OSHA general industry standards to allow for safe resumption of work.

Measures will include:

- Prompt clean-up
- HEPA vacuuming
- Wet-washing of the affected area
- Proper containerization and labeling/storage of any ACM debris.
- Exposure monitoring

The Facility's Asbestos Manager shall document actions that were taken to correct the situation.

5.5.3 Minor Disturbance/Fiber Release Episode (Less Than 3 Square or Linear Feet of ACM)

If the Facility's Asbestos Manager recognizes *a minor disturbance/fiber release episode*, Class III corrective measures shall be undertaken by an appropriately trained asbestos O&M worker following all USEPA, OSHA and CTDPH Regulations to allow for the safe re-occupancy of the area.

Measures will include:

- Prompt clean-up
- HEPA vacuuming
- Wet-washing of the affected area
- Proper containerization and labeling/storage of any ACM debris
- Exposure monitoring
- Airtight enclosures

Minor repair and maintenance construction activity shall be undertaken by personnel who have received at least 16-hr OSHA Class III level training.

The Facility's Asbestos Manager shall document actions that were taken to correct the situation.

5.5.4 Specific control methods for ACM removal within Glovebags

Glove bag systems may be used to remove PACM and/or ACM from straight runs of piping and elbows and other connections with the following specifications and work practices:

Specifications:

- Glovebags shall be made of 6 mil thick plastic and shall be seamless at the bottom.
- Glovebags used on elbows and other connections must be designed for that purpose and used without modifications.

Work Practices:

- Each glovebag shall be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.
- Glovebags shall be smoke-tested for leaks and any leaks sealed prior to use.
- Glovebags may be used only once and may not be moved.
- Glovebags shall not be used on surfaces whose temperature exceeds 150 deg. F.
- Prior to disposal, glovebags shall be collapsed by removing air within them using a HEPA vacuum.
- Before beginning the operation, loose and friable material adjacent to the glovebag/box operation shall be wrapped and sealed in two layers of six mil plastic or otherwise rendered intact,
- Where system uses attached waste bag, such bag shall be connected to collection bag using hose or other material which shall withstand pressure of ACM waste and water without losing its integrity:
- Sliding valve or other device shall separate waste bag from hose to ensure no exposure when waste bag is disconnected:
- At least two persons shall perform Class I glovebag removal operations.

5.5.5 Substantial Disturbance (Greater Than 3 Square or Linear Feet of ACM)

If the Facility's Asbestos Manager determines a significant problem (i.e. larger amounts of asbestos debris on floor, potential fiber release in the air, more than 3 LF/SF disturbed) has been created by the disturbed asbestos, personnel shall leave the area, the HVAC system will be modified, the area shall then be secured from unauthorized entry and OSHA "Danger Asbestos Regulated Area" warning signs shall be posted.

The Facility's Asbestos Manager shall review the asbestos survey report for information.

A designated Asbestos Consultant may be called in immediately to document the spread of contamination, conduct area environmental air sampling and support the Facility's Asbestos Manager in devising a response action suitable to correct the situation.

A designated Asbestos Contractor shall be called in immediately for the abatement actions that are required under OSHA Class I/II and CTDPH requirements.

The Facility's Asbestos Manager shall arrange for actions to restore clean conditions and/or abate asbestos before further work continues.

If the Facility's Asbestos Manager recognizes that asbestos abatement shall be required of greater than 3 square or 3 linear feet of friable asbestos, verify that emergency notifications are made to the CTDPH and/or quantities to be abated verified for inclusion under any blanket notifications.

The Facility's Asbestos Manager shall document actions that were taken to correct the situation.

5.6 Recordkeeping

The Facility's Asbestos Manager is responsible for maintaining all records pertaining to asbestos. The records to be maintained should include the following:

1. Documentation of locations of ACM within the Facility's
2. Employee and Contractor Notification Letters
3. Personnel Training Record Summary
4. Periodic Surveillance Inspection Reports
5. Records of Asbestos Abatement Activity or other Response Actions
6. Copies of CTDPH/USEPA Asbestos Abatement Notification Forms
7. Copies of Final Air Clearance Testing Forms
8. Copies of Waste Shipment Records
9. Amendments to the O&M Plan

Completed forms will be filed with and retained by the Facility's Asbestos Manager and inserted into the appropriate Appendices.

6.0 **MEDICAL SURVEILLANCE/PERSONAL PROTECTIVE EQUIPMENT**

Medical Program

- A. Should GBCMHC elect to have in-house personnel performing emergency ACM clean-up, intentional ACM O&M repair/removal (<3LF/3SF) or housekeeping activities in regulated areas, then GBCMHC (as well as asbestos related contractors) shall establish a medical surveillance program, prior to assignment, for employees who will be required to wear respirators, for employees who perform general industry related activities who are exposed to asbestos in

concentrations above the 8-hr TWA and/or 30-minute excursion limit PELs, for employees engaged in construction related Class I, II, or III work as defined in OSHA 1926.1101 for more than 30 days per year or are exposed above the PELs for more than 30 days per year, or will be performing CTDPH defined asbestos abatement.

1. Examinations must be performed under the supervision of a licensed physician and shall be provided without cost to the employee and at reasonable time and place in accordance with OSHA 29 CFR 1910.1001 and/or OSHA 29 CFR 1926.1101 as applicable.
2. Examinations must include a medical and work history and a physical examination with special emphasis directed to the respiratory, cardiovascular and gastrointestinal systems; completion of a respiratory disease questionnaire; a chest X-ray administered at the discretion of the physician, and pulmonary function tests which include as a minimum, forced vital capacity (FVC), forced expiratory volume at one second (FEV-1) and maximum voluntary ventilation (MVV).
3. Examinations shall be given prior to employees being assigned to duties exposed to airborne asbestos in excess of the PELs, prior to assignment to an area where negative pressure respirators are worn, annually, and at the termination of employment.

B. Employer shall provide the examining physician with a copy of the following:

1. OSHA STANDARD (interpretation and classification of chest roentrogram).
2. A description of the employee's duties relating to the employee's asbestos exposure
3. The exposure level or anticipated exposure level
4. A description of any personal protective and respiratory equipment used or to be used
5. Information from previous medical examinations.

C. Employer must obtain a written signed opinion from the physician which contains:

1. The results of the medical examination and the physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk from exposure to asbestos.
2. Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators
3. A statement that the employee has been informed by the physician of the results of the medical examination and risks attributable to the combined effects of smoking and asbestos exposure. The physician is not to reveal

in the written opinion given to the employer specific findings or diagnosed unrelated to occupational exposure to asbestos. Employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

- D. Employer must maintain an accurate record for each employee subject to medical surveillance. The record must include:
1. The name and social security number of the employee
 2. A copy of the employee's medical examination results
 3. A physician's written opinions
 4. Any employee medical complaints related to exposure to asbestos
 5. Information provided to the examining physician as described under medical surveillance.
- E. Medical surveillance records must be maintained for the duration of employment plus 30 years.
- F. Refer to **Appendix K** for a copy of Medical Surveillance Forms for applicable in-house personnel.

PROTECTIVE EQUIPMENT

Protective Clothing

- A. Should GBCMHC elect to have in-house personnel performing emergency ACM clean-up, intentional ACM O&M repair/removal (<3LF/3SF) or housekeeping activities in regulated areas where the use of protective clothing is required, then GBCMHC (as well as asbestos related contractors) shall provide disposable protective clothing to each individual who shall perform such tasks to prevent personal contamination in accordance with OSHA 29 CFR 1910.1001 and/or 29 CFR 1926.1101 as applicable.
- B. Disposable protective clothing contaminated with asbestos shall be removed in equipment/change rooms as discussed in Section 11.0 and discarded as ACM waste after use.
- C. Protective clothing would be required when there are any general industry workplace operations which expose employees to airborne concentrations of asbestos which exceed the TWA and/or excursion limit PELs, during any OSHA Class II-IV construction activity for which a negative exposure assessment has not been developed, during any Class I work, and during all CTDPH defined asbestos abatement project work.

Other Equipment

Other safety equipment routinely required by GBCMHC (ie. safety glasses, hard hats, ear protection, gloves, etc.) shall continue to be required under this plan. Equipment taken within an asbestos regulated area shall be decontaminated prior to exiting the area, or disposed of as ACM waste

APPENDIX A

LABORATORY AND INSPECTOR ACCREDITATIONS

1002301 01 AV 0.388 **AUTO T 1 2 1264 06095-159021 -C01-P02305-1



GREGORY A. KACZYNSKI
TRC ENVIRONMENTAL CORP.
21 GRIFFIN ROAD NORTH
WINDSOR CT 06095-1590



Dear GREGORY A. KACZYNSKI,

Attached you will find your validated certificate for the coming year. Should you have any questions about your certificate renewal, please do not hesitate to write or call:

Department of Public Health
P.O. Box 340308
M.S.#12MQA
Hartford, CT 06134-0308

(860) 509-7603
oplc.dph@ct.gov
www.ct.gov/dph/license

Sincerely,

JEWEL MULLEN, MD, MPH, MPA, COMMISSIONER
DEPARTMENT OF PUBLIC HEALTH

EMPLOYER'S COPY

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

NAME
GREGORY A. KACZYNSKI

VALIDATION NO. 03-280751 CERTIFICATE NO. 000550 CURRENT THROUGH 07/31/16

PROFESSION
ASBESTOS CONSULTANT-INSPECTOR

SIGNATURE COMMISSIONER

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT
THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A
ASBESTOS CONSULTANT-INSPECTOR

GREGORY A. KACZYNSKI

CERTIFICATE NO. 000550
CURRENT THROUGH 07/31/16
VALIDATION NO. 03-280751

SIGNATURE COMMISSIONER

1002301-0002305-0000001 of 0000001-C01-0100101-1264-02305

CERTIFICATE OF ACHIEVEMENT

This certifies that

Gregory Kaczynski

has successfully completed the
4 Hour Asbestos Site Inspector Refresher Training
Asbestos Accreditation Under TSCA Title II
40 CFR Part 763

conducted by

ATC Group Services, LLC
73 William Franks Drive
West Springfield, MA 01089
(413) 781-0070

Thomas Dixon

Principal Instructor: Thomas Dixon

September 15, 2016

Date of Course

September 15, 2017

Expiration Date

Gregory Morsch

Regional Training Manager: Gregory Morsch

SIAR - 5522

Certificate Number

September 15, 2016

Examination Date

State of Connecticut, Department of Public Health
Approved Environmental Laboratory

THIS IS TO CERTIFY THAT THE LABORATORY DESCRIBED BELOW HAS BEEN APPROVED BY THE STATE DEPARTMENT OF PUBLIC HEALTH PURSUANT TO APPLICABLE PROVISIONS OF THE PUBLIC HEALTH CODE AND GENERAL STATUTES OF CONNECTICUT FOR MAKING THE EXAMINATIONS, DETERMINATIONS OR TESTS SPECIFIED BELOW WHICH HAVE BEEN AUTHORIZED IN WRITING BY THAT DEPARTMENT.

TRC ENVIRONMENTAL CORPORATION

LOCATED AT 21 Griffin Road North IN Windsor, CT 06095
AND REGISTERED IN THE NAME OF Erik Plimpton

THIS CERTIFICATE IS ISSUED IN THE NAME OF Kathleen Williamson WHO HAS BEEN DESIGNATED BY THE REGISTERED OWNER, AUTHORIZED AGENT TO BE IN CHARGE OF THE LABORATORY WORK COVERED BY THIS CERTIFICATE OF APPROVAL AS FOLLOWS:

**BUILDING MATERIALS
ASBESTOS FIBERS - PCM
BULK IDENTIFICATION - PLM**

SEE COMPUTER PRINT-OUT FOR SPECIFIC TESTS APPROVED

THIS CERTIFICATE EXPIRES DECEMBER 31, 2017 AND IS REVOCABLE FOR CAUSE BY THE STATE DEPARTMENT OF PUBLIC HEALTH DATED AT HARTFORD, CONNECTICUT, THIS 7th DAY OF December 2015



Registration No.
PH-0426



SUZANNE BLAIN-CARLOR, IMS
CHIEF, ENVIRONMENTAL HEALTH SECTION

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101424-0

TRC Environmental Corporation
Windsor, CT

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Asbestos Fiber Analysis

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-IAC-IAF Communiqué dated January 2009).*

2015-06-22 through 2016-06-30
Effective Dates



A handwritten signature in black ink, which appears to read "William R. Murphy".

For the National Voluntary Laboratory Accreditation Program



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

TRC Environmental Corporation

21 Griffin Road North

Windsor, CT 06095

Ms. Kathleen Williamson

Phone: 860-298-6392 Fax: 860-298-6214

Email: kwilliamson@trcsolutions.com

<http://www.trcsolutions.com>

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 101424-0

Bulk Asbestos Analysis

Code

Description

18/A01

EPA 600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

18/A03

EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

A handwritten signature in black ink, appearing to read "William R. Murphy".

For the National Voluntary Laboratory Accreditation Program

APPENDIX B

GLOSSARY

The following list of definitions is a compilation of terms from various regulatory texts, guidance manuals and industry handbooks.

Abatement - Procedures to control fiber release from asbestos-containing materials; includes but is not limited to removal, encapsulation, enclosure, repair, demolition and renovation activities.

AHERA - Asbestos Hazard Emergency Response Act - U. S. EPA regulation 40 CFR Part 763 under Section 203 of Title II of the Toxic Substances Control Act (TSCA), 15 U.S.C. 2643. This rule mandates inspections, accreditations of persons involved with asbestos, and final air clearances following abatement in public and private schools.

Air Monitoring - The process of measuring the fiber content of a specific volume of air during a stated period of time. The procedure normally utilized for asbestos follows the NIOSH 7400 method. For clearance air monitoring, electron microscopy methods may be utilized for lower deductibility and specific fiber identification.

Amended Water - Water to which a surfactant or chemical wetting agent has been added.

Area Sampling - Sampling of asbestos fiber concentrations within the Asbestos Control Area and outside the Asbestos Control Area.

Asbestos - The term asbestos includes chrysotile, amosite, crocidolite, asbestiform tremolite, asbestos, anthophyllite asbestos, actinolite asbestos and any of these minerals that has been chemically treated and/or altered.

Asbestos Abatement - The removal, encapsulation, enclosure, renovation, repair, demolition or other disturbance of asbestos-containing materials.

Asbestos Abatement Project - Any asbestos abatement activity involving more than three (3) linear feet or three (3) square feet of asbestos-containing material.

Asbestos Abatement Site Supervisor - Any individual who is employed or engaged by an asbestos contractor to act as a competent person and supervise an asbestos abatement project.

Asbestos Abatement Worker - Any employee of an asbestos contractor who engages in asbestos abatement, and who is certified to perform such activities.

Asbestos-Containing Material (ACM) - Material composed of asbestos of any type in an amount greater than one percent (>1%) by volume, either alone or mixed with other fibrous or non-fibrous materials.

Asbestos Contractor - Any person or entity engaged in asbestos abatement whose employees actually perform the asbestos abatement work.

Asbestos Control Area - An area where asbestos abatement operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris. Two examples of an Asbestos Control Area are a "full containment" and a "glovebag."

Category I Non-Friable ACM - Asbestos-containing packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in Appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

Category II Non-Friable ACM - Any material, excluding Category I non-friable ACM, containing more than 1 percent asbestos as determined using the method specified in Appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Class I Asbestos Work - Activities involving the removal of thermal system insulation and surfacing ACM and PACM.

Class II Asbestos Work - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III Asbestos Work - Repair and maintenance operations where "ACM" including thermal system insulation and surfacing material is likely to be disturbed.

Class IV Asbestos Work - Maintenance and custodial activities during which employees contact ACM and PACM and activities to clean up waste debris containing ACM and PACM.

Clean Room - An uncontaminated room which is part of the Worker Decontamination Enclosure System with provisions for workers to store personal articles and clothing.

CFR - Code of Federal Regulations.

Competent Person - Individual capable of identifying existing asbestos, tremolite, anthophyllite, or actinolite hazards and corrective measures to eliminate them, as specified in 29 CFR 1926.1101 and 40 CFR Part 763. The duties of the Competent Person include at least the following: establishing the pressure differential, ensuring its integrity, and controlling entry to and exit from the enclosure; supervising any employee exposure monitoring required by the standard; ensuring that employees working within such an enclosure wear the appropriate personal protective equipment, are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and

decontamination procedures specified; and ensuring that engineering controls in use are in proper operating condition and are functioning properly.

Critical Barrier - A minimum of two layers of six (6) mil polyethylene sheeting taped securely over windows, doorways, diffusers, grilles and any other openings between the Work Area and uncontaminated areas outside of the Work Area, including the outside of the building.

Decontamination Enclosure System - A series of rooms separated from the Work Area and from each other by air locks, for the decontamination of workers and equipment.

Differential Pressure - A difference in the static air pressure between the Work Area and occupied areas, and is developed by the use of HEPA filtered exhaust fans. This differential is generally in the range of 0.02 to 0.04 inches of water column.

Encapsulant - Specific materials in various forms used to chemically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulant as follows:

- a. Removal Encapsulant (can be used as a wetting agent).
- b. Bridging Encapsulant (used to provide a tough durable surface coating to asbestos containing material).
- c. Penetrating Encapsulant (used to penetrate the asbestos containing material down to substrate, encapsulating asbestos fibers).
- d. Lock-down Encapsulant (used to seal off "lock-down" minute asbestos fibers left on surfaces from which asbestos containing materials have been removed).

Encapsulation - The application of an encapsulant to asbestos-containing building materials to control the possible release of asbestos fibers into the air.

Enclosure - The construction of an air-tight, impermeable, permanent barrier around asbestos containing material to control the release of asbestos fibers into the air.

Engineering Controls - Controls to include, but not be limited to, pressure differential equipment, decontamination enclosures, critical barriers and related procedures.

Fixed Critical Barrier - Barrier constructed of 2" x 4" wood or metal framing 16" O.C., with 2" plywood on the occupied side and two layers of six (6) mil polyethylene sheeting on the Work Area side to prevent unauthorized access or air flow.

Friable Asbestos Material - Material containing more than 1 percent asbestos as determined using the method specified in Appendix A, subpart F, 40 CFR part 763, Section 1, Polarized Light Microscopy, that when dry can be crumbled, pulverized or

reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

Glovebag - A sealed compartment with attached inner gloves used for the handling of asbestos-containing materials. Properly installed and used glove bags provide a small Work Area enclosure typically used for small scale asbestos stripping operations. Information on glovebag installation, equipment and supplies, and work practices is contained in the Occupational Safety and Health Administration's (OSHA's) final rule on occupational exposure to asbestos (appendix G to 29 CFR 1926.1101).

Glovebag Technique - A method with limited applications for removing small amounts of friable asbestos-containing material from HVAC ducts, short piping runs, valves, joints, elbows, and other non-planar surfaces in a non-contaminated work area. The glovebag assembly is a manufactured or fabricated device consisting of a glovebag (typically constructed of six (6) mil polyethylene or polyvinyl chloride plastic), two inward projecting long sleeves, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains asbestos fibers released during the process.

HEPA Filter Equipment - High-efficiency particulate air (HEPA) filtered vacuum and/or exhaust ventilation equipment with a filter system capable of trapping and retaining asbestos fibers. Filters shall be of 99.97 percent efficiency for retaining fibers of 0.3 microns in diameter or larger.

Industrial Hygienist - An individual who functions as the on-site representative overseeing the activities of the asbestos contractor.

Lock-Down - The procedure of spraying polyethylene sheeting and building materials with an encapsulant type sealant to seal in non-visible asbestos-containing residue.

Medical Records - For employees exposed to airborne asbestos fiber concentrations in excess of the 8-hr TWA and/or the 30 minute excursion level, maintain complete and accurate records of employee's medical examinations for a period of at least 30 years after termination of employment. Make records of the required medical examinations available for inspection and copying to the State of Oregon's authorized representatives.

Negative Air Pressure Equipment - A portable local exhaust system equipped with HEPA filtration used to create reduced pressure in a contaminated area with respect to adjacent uncontaminated areas, and capable of maintaining a constant, low velocity air flow into contaminated areas from adjacent uncontaminated areas.

Non-Friable Asbestos-Containing Material - Material containing more than 1 percent asbestos as determined using the method specified in Appendix A, subpart F, 40 CFR

part 763, section 1, Polarized Light Microscopy, that when dry cannot be crumbled, pulverized or reduced to powder by hand pressure.

Permissible Exposure Limit (PEL) - An airborne concentration of asbestos, tremolite, anthophyllite, actinolite or a combination of these minerals of 0.1 fibers per cubic centimeter (f/cc) of air calculated as an eight (8) hour time-weighted average, as determined by Phase Contrast Microscopy.

Personal Monitoring - Air sampling within the breathing zone of an employee.

Pre-Clean - The process of cleaning an area before asbestos abatement activities begin to ensure dust and debris in the area considered to be asbestos-containing are properly contained and disposed of. This increases the likelihood the area will pass aggressive air sampling clearance requirements after asbestos-containing materials have been removed.

Regulated Area - Area established by the employer to demarcate areas where airborne concentrations of asbestos, tremolite, anthophyllite, actinolite or a combination of these minerals exceed, or can reasonably be expected to exceed, the Permissible Exposure Limit.

Spot Repair - Asbestos abatement performed within a facility involving not more than three (3) linear feet or three (3) square feet of asbestos-containing material.

Surfactant - A chemical wetting agent added to water to improve penetration.

Thermal System Insulation (TSI) - Materials applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

Vinyl Asbestos Floor Covering - Asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in Appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

Visible Emissions - Any emissions, which are visually detectable without the aid of instruments, coming from RACM or asbestos-containing waste material or from any asbestos milling, manufacturing, or fabricating operation. This does not include condensed, uncombined water vapor.

Waste Shipment Record - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

APPENDIX C

SUMMARY OF PERTINENT REGULATIONS

Connecticut Department of Public Health

The CTDPH asbestos requirements are applicable to any abatement of asbestos materials, including abatement projects and small-scale short duration activities and those personnel performing abatement or consulting activities. Contractors performing abatement of asbestos must be licensed by CTDPH and those individuals performing work must be certified by as workers/supervisors and must be licensed in the State of Connecticut to conduct these activities.

The CTDPH regulation applies to all abatement work inside public, commercial, and residential structures.

The CTDPH regulation defines an asbestos abatement project as one which involves greater than or equal to 3 linear or 3 square feet of asbestos material. For asbestos projects involving greater or equal to 3 linear or 3 square feet of asbestos material, the Asbestos Abatement Contractor must prepare and submit a notification form to the CTDPH. This notification must be submitted on CTDPH forms ten calendar days before the start of a project involving ACM.

Prior to renovation/demolition, an asbestos survey must be conducted and any affected asbestos must be removed before renovation/demolition activities. General abatement activity requirements are specified in the CTDPH regulations. The abatement work area must be put under a negative pressure enclosure and worker and waste decontamination facilities must be set up contiguous to the work area.

The regulation specifies wet removal practices and use of encapsulants as well as waste packing labeling and disposal. Disposal must be at an approved CTDPH site and identified on the CTDPH waste shipment form. Reoccupancy into an abatement area is not allowed until a post abatement visual inspection and final air clearance testing are satisfactorily completed for jobs involving greater or equal to 3 linear or 3 square feet of ACM.

Connecticut and Federal OSHA

The Connecticut and Federal Occupational Safety and Health Administration (OSHA) enforce the same set of regulations, OSHA's General Industry Standard (29 CFR Part 1910.1001) and Construction Industry Standard for Occupational Exposure to Asbestos (29 CFR Part 1926.1101). OSHA standards require building owners to identify asbestos-containing materials in their facility. The standards require building owners to treat as asbestos any thermal system insulation, surfacing, and flooring materials installed no later than 1980, unless analytical testing proves otherwise and provide proper hazard communication regarding the presence of ACM including signs, labeling and training.

OSHA has established a specific bulk sampling protocol to be used to determine if a material contains asbestos through laboratory analysis. This sampling and analytical

process is also the only way to determine whether or not an assumed or presumed suspect material is indeed negative for asbestos content. The bulk sampling protocol was taken from and references the method in EPA's Asbestos Hazard Emergency Response Act (AHERA) or Asbestos-Containing Materials in Schools Rule (40 CFR Part 763).

All construction related work which may disturb asbestos (e.g. demolition, removal, encapsulation, construction, alteration, repair, maintenance and custodial work, renovation, installation, emergency clean-up, transportation, storage and disposal) is regulated by these standards. The regulations do not apply to asphalt roof coatings, cements and mastics but do include roof felts.

The standard defines four classes of work as follows:

- Class I - TSI and surfacing removal of ACM
- Class II - Removal of ACM other than TSI and surfacing,
- Class III - Repair and maintenance where ACM may be disturbed,
- Class IV - Maintenance and custodial work only if associated with a construction asbestos project.

The standard also defines a regulated area as an area which is established to demarcate areas where Class I, II and III asbestos work is conducted. The regulation further defines the requirements for labeling of regulated areas, proper work practices, engineering controls (including regulated areas and/or negative pressure enclosures, construction and use of decontamination facilities), training requirements and respiratory protection requirements for each work class.

OSHA has established a Permissible Exposure Limit (PEL) for asbestos of 0.1 fibers/cc, 8 hour time weighted average (TWA) and an Excursion Limit (EL) of 1.0 fibers/cc over a 30 minute time period of peak work. Under the regulation OSHA requires personal air sampling which in turn aids in determining proper respiratory protection.

Medical surveillance is required for those employees, under the regulation, who are issued a negative pressure respirator and/or for a combined total of 30 days or more per year either engage in Class I, II, or III work and/or who are exposed above the PEL or EL.

Specific recordkeeping requirements are also established in the standard. They are 30 years for exposure monitoring results, duration of work plus 30 years for medical surveillance records and one year for training records.

The standards also spell out specific housekeeping and maintenance activities to be undertaken when installed ACM/PACM is present.

The EPA has several regulations and guidance documents pertaining to asbestos. The National Emission Standards for Hazardous Air Pollutants or Asbestos NESHAP, (40 CFR Part 61 Subpart M) requires building owners to inspect their facilities for asbestos prior to beginning any demolition or renovation activities.

The EPA's "Asbestos-Containing Materials in Schools," (a.k.a. AHERA Regulation or 40 CFR Part 763 Subpart E) has detailed training requirements for personnel providing consulting and abatement services and is specifically referenced in the OSHA regulations and applicable to non-school facilities.

The EPA also published a guidance document called "Managing Asbestos in Place-A Building Owners Guide to Operations and Maintenance Programs for Asbestos-Containing Materials. It is commonly referred to as the "EPA Green Book" and has been instrumental in the development of this program.

Key aspects of the NESHAP regulation focus on demolition and renovation activities and the waste disposal from demolition and renovation. Demolition is defined as any work involving taking out load supporting building members or intentional burning. Renovation is defined as altering a facility component in any way including stripping of asbestos. This regulation covers practically all facilities, activities and buildings with the exception of residential home exemptions. Additional key definitions set forth in the regulation include:

Category I Non-Friable means resilient flooring, asphalt roofing, gaskets and packings greater than 1 percent asbestos,

Category II Non-Friable means any other non-friable material with greater than 1 percent asbestos,

Regulated asbestos-containing material or RACM which means 1) friable asbestos, 2) Category I asbestos which has become friable, 3) Category I asbestos which is subject to sanding, grinding, saw-cutting or abrading, 4) Category II asbestos which has a high probability of becoming pulverized, crumbled or reduced to powder during renovation or demolition activities.

The entire facility or the affected part of a facility must be inspected for asbestos prior to any demolition or renovation.

Notification of abatement of demolition activity is required to be submitted to the EPA 10 working days prior to the start of activity.

The NESHAP enforces the "no visible emissions" rule, requires wet removal and has set specific material drop restrictions (material must be transported to the ground via leak-

tight chutes or containers if it has been removed or stripped more than 50 feet above ground level and was not removed in units/sections).

The regulation requires the removal of asbestos before demolition or renovation if friability is possible. Removal is required before disturbance or dislodging will result and a plan must be in place to handle any unexpected RACM which is exposed during a project.

The NESHAP has established specific requirements regarding waste disposal and tracking of waste. Each waste bag must be labeled with the site and generator name in addition to the usual OSHA labeling. Asbestos waste must be disposed of in an EPA approved landfill. The waste vehicle must be labeled during loading and unloading. EPA must be notified if the waste shipment record is not received within 45 days of the shipment date. Records should be maintained for all asbestos abatement activities including but not limited to notification forms, inspection reports and bulk samples, and waste shipment records.

The AHERA regulation itself is strictly applicable to school facilities only, however Appendix C of the regulation, "The Model Accreditation Plan" or MAP, is applicable to work in commercial facilities as well. The MAP spells out specific training requirements for any individual engaged in asbestos related activity and is also referenced by the OSHA standards.

APPENDIX D

SIGNS

(attach label here)

To: Employees

This posting is to alert you to the presence of asbestos-containing materials (ACM) within this building/area. An Operations & Maintenance (O&M) program has been established to monitor the condition of the ACM and ensure safe working conditions for persons entering the building/area. Any questions may be directed to the facility Facility's Asbestos Manager listed below.

Facility's Asbestos Manager: Tom Ford
Location: _____
Phone: _____

In general, the following forms of ACM listed below, along with their general locations, are present within the building/area. You are invited to view the O&M plan to obtain further information on the exact types and locations of the ACM within the building.

Building/Area:	
Asbestos-Containing Material	General Location

Do not disturb the ACM or use dry sweeping or non-HEPA vacuums to clean up ACM debris. Report ACM damage/debris to the Facility's Asbestos Manager immediately.

APPENDIX E

LABELS



CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST
(attach label here)

CANCER AND LUNG DISEASE HAZARD

AVOID BREATHING AIRBORNE ASBESTOS FIBERS

Randy Made Sign Co. 1-800-544-2440

ASB2

APPENDIX F

EMPLOYEE/CONTRACTOR NOTIFICATION LETTERS

NOTIFICATION

To: Employees
Tenants
Contractors

Re: Asbestos Presence in Facility Buildings

This notification is to alert you to the presence of asbestos-containing materials (ACM) within the buildings at our facility. An Operations & Maintenance (O&M) program has been established to monitor the condition of the ACM and ensure safe working conditions for persons entering the building. You are invited to view the O&M plan to obtain further information on the exact locations and quantities of the ACM within the facility buildings. Any questions may be directed to the facility Facility's Asbestos Manager listed below.

Facility's Asbestos Manager: Tom Ford_____

Address/Location: _____

Phone: _____

Contractor Notification Letter

A recent asbestos inspection of the GBCMHC Building in Bridgeport, Connecticut, identified the presence of asbestos-containing fire door insulation, door window glazing, mudded insulation on pipe fittings, mudded material on valves/ends, roof drains, etc., mudded duct sealant and residual mudded materials, pipe gaskets, window glazing, glue daubs under cloth, caulking, fire stop, sink undercoating, floor tile/mastic, residual mastic, counter undercoating, mirror glue daubs, wall panel glue, electrical panel components, bulletin board/marker glue daubs, metal wall panel components, grout/glue associated with ceramic wall/floor tile, insulation/sealant on underside of kitchen serving areas & in refrigerator units, counter backsplash glue, glue behind carpet pin boards and ceiling tiles . A table which describes the locations of these asbestos-containing materials is attached.

Renovation or demolition of ACM could result in airborne asbestos release. Only licensed asbestos abatement contractors registered with the State of Connecticut are permitted to disturb, remove or otherwise handle the ACMs.

Please review the list of materials attached and contact me before beginning any work which may involve disturbing known or suspected ACMs.

Thank you for your cooperation.

Sincerely,

Tom Ford
GBCMHC's Asbestos Manager

I have reviewed this letter and the attached tables. *Prior to any potential disturbance* of these materials **OR** *immediately upon any accidental disturbance*, I will contact GBCMHC's Asbestos Manager.

Contractor's signature: _____

Date: _____

APPENDIX G

**PERSONNEL TRAINING RECORDS
(FILLED OUT FORMS)**

APPENDIX H

**PERIODIC SURVEILLANCE FORMS
(FILLED OUT FORMS)**

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
FD1-white insulation in wood fire door (weldwood composite – underwriter laboratories)	Hallway doors to room 170, 149, 148, 147, 141, 140	Intact		
FD2 – white insulation in wood fire door with 6"x3' window	Hallway doors to room 855, 755, 655, 555, 327, 250	Intact		
FD3-white insulation in 8' high wood double doors with 1'x4' window	Hallway doors to room 802 (4 doors), 502 (4 doors),	Intact		
FD1 – white fire door insulation	Nurse 507, Office 526, Office 533, Bath 510	Intact		
Fire door insulation	Throughout building	Intact		
DWG2 – soft gray, putty glaze on metal door window	Corridors 37, 550, 750, Rooms 113, 247, 601	Intact		
DWG3 – hard gray glaze on metal door mesh window	Corridors 3 & 46, Rooms 415, 615 & 815	Intact		
DWG2 – grey hard door window glaze	Meeting room 519 A/B door	Intact		
MF2-light grey uncovered mudded fittings on fiberglass lines	Throughout building (above ceilings, in pipe chases, wall cavities, mechanical rooms, etc.)	Intact		
Mudded fitting (MF2) debris in pipe chases	Throughout all pipe chases	Damaged (Presumed throughout all pipe chases)		

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
Cloth wrapped mudded fittings on fiberglass insulated pipes (MF4, MF5, MF6)	All mechanical rooms, room 32 and throughout building	Damaged (Ground floor – Mech. Room 44 - 1 SF of debris on floor/pipes)		
MF7-white uncoverd mudded fitting on 6" OD fg line	3 rd floor - Entry 337 & hospital connector	Intact		
Mudded roof drains	Throughout 8 th floor	Intact		
DI2-mudded duct sealant on outside of fiberglass duct insulation on seam	5 th floor mech room	Intact		
MR1-mudded residual material	Ground floor – mech room 44	Damaged (Ground floor – Mech. Room 44 - 1 SF of debris on top of EC1)		
MR1A-mudded residual material	8 th floor – mech room	Damaged (8 th floor – Mech. Room 845 - 1 SF of debris)		
MR2-mudded residual on corner of fiberglass duct insulation	Mech room 745	Intact		
Pipe gaskets	Throughout mechanical rooms	Intact		
WG1-hard grey brittle glaze on interior metal framed windows	Rooms 115, 137, 170, 207, 209, 238, 239, 305, 404, 417, 418, 433, 434, 509, 535, 635, 709, 809, 818, 825	Intact		

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
WG2-dark grey putty window glaze	Rooms 231, 228, 709 & 809	Intact		
WG3-grey putty window glazing	Throughout 7 th floor – upper windows (<i>many above current ceilings</i>)	Intact		
WG4-grey hard glazing on interior of exterior windows (that don't open)	Throughout Building	Intact		
WG5-dark grey window glazing on interior of exterior windows (that open)	Throughout Building	Intact		
G9-white glue under cloth sill	3 rd floor – connector (<i>under cloth on sill & potentially walls</i>)	Intact		
C1-yellow hard semi-flexible caulk	Corridors – 37 & 43, Rooms 4, 49, 50, 337, 426	Intact		
C5-tan semi flexible caulk	Mech room 442, 745 & 845	Intact		
C6-grey putty-like caulk	Mech rooms 442, 745 & 845	Intact		
C9-grey sticky caulk	Exterior – around all windows	Intact		
FS1-brown putty fire stop (FP3-2/15)	Throughout building – potentially at all pipe/conduit/etc. penetrations	Intact		

**PERIODIC SURVEILLANCE FORM
THE GBMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
SU2-light purple sink undercoating	Rooms 419, 546, 746 & 819A	Intact		
Sink undercoating	Room 537	Intact		
SI1 – pink sink insulation	Meeting room 519A	Intact		
FT1-12x12 multi-color cream confetti floor tile & residual black mastic	Room 7	Intact		
FT2-12x12 cream floor tile and associated yellow & black mastic	Room 8 and 9	Intact		
FT3A-12x12 green w/ light green mottled (confetti) floor tile & associated black mastic	Corridors 534, 536, 550, 736 & 750, Elevator lobby 501 & 701, Rooms 519A&B, 527, 535, 543, 554, 555 & 743	Intact		
FT4A-12x12 tan with white confetti floor tile & associated black mastic	Rooms 107, 108, 110, 111, 115, 117, 124, 125, 127, 147-150, 164, 169, 170, 173, 511, 513, 514, 525, 528-533, 538-540, 548, 549, 606-609, 611, 612, 613A&B, 614A&B, 625, 626, 631, 638-640, 648, 649, 738-740, 743	Intact		
FT5A-12x12 tan floor tile w/white streaks & associated black mastic	Corridors 6, 31 & 43, Rooms 10, 11, 35-37, 306-308, 334-336, 506-509, 512, 560, 709 812 & 860	Intact		

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
FT5-12x12 light beige confetti floor tile and associated tan and residual black mastic	Rooms 16-19, 25, 38, 39, 112, 135, 136B, 137, 139-143, 208, 227, 228, 231-233, 234A, 235A&B, 238, 249, 250, 245B, 246, 254, 705, 712 & 805	Intact		
FT6-12x12 light tan w. small brown & white flecks floor tile & associated amber glue	Room 103 & Room 112 (residual mastic only - under floor tile)	Intact		
FT9-12x12 grey with heavy white streaks floor tile & associated black mastic	Room 205 & 809	Intact		
FT11-12x12 dark tan with dark & light tan streaks floor tile & associated black mastic	Rooms 225, 226, 239, 241, 452, 453, 854 & 855	Intact		
FT12-12x12 green with small black and white flecks floor tile & associated black mastic	Rooms 211, 212, 214 & 256	Intact		
FT13-12x12 light brown floor tile & associated black mastic	Room 213	Intact		
FT15-12x12 dark brown with black confetti floor tile and associated light tan & black mastic	Cafeteria areas 329A-C (bottom layer), Corridors 316, 325, 332, 338, 601, 636 & 650, Elevator lobby 301, Rooms 327, 328A, 329D, 337, 627, 643 & 661	Intact		
FT16-12x12 light brown w/ dark brown and white confetti floor tile & associated black mastic	Cafeteria office & serving area 319 (bottom layer), Rooms 313A-C, 314A-C,	Intact		
FT18-12x12 marble pattern floor tile & associated black mastic	Corridor 413, Rooms 206, 207, 209, 405-408, 413A-C, 414A-C, 418, 419, 425B&C, 426-432, 417-419, 433-439, 445-447, 454, 457, 561	Intact		

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
FT22-12x12 maroon confetti (with some white confetti) floor tile & associated black mastic	Corridors 816 & 850, Elevator lobby 801, Room 861	Intact		
FT26-12x12 tan confetti w/ "grip" texture floor tile & associated black mastic	3 rd Floor Connector (to Hospital)	Intact		
FT27-12x12 black with white confetti floor tile and associated black & tan mastic	Elevators	Intact		
Black mastic associated with 12x12 off-white floor tile w/ mottled tan flakes (FT6)*	Room 503, Room 504, Corridor 516, Room 526, Corridor 534	Intact		
Black mastic associated with 12x12 light/dark salmon floor tile (FT7)*	Balcony 515, Corridor 516, Corridor 524, Hallway 534	Intact		
M2-residual black mastic	Rooms 106 (under carpet), 255 (under floor tile)	Intact		
RM1-black residual mastic	Room 619A&B, 628-630 & 632	Intact		
RM2-black residual mastic	Rooms 806-808, 813A&B, 814, 817, 818, 819A&B, 825, 826, 841 & 862,	Intact		
Residual black mastic	Throughout building – under carpet or tiles (<i>in any areas which were not previously sampled</i>)	Intact		
WCU1-brown metal counter undercoating	Pantry 537, 637, 737, 837	Intact		

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
Mirror glue daubs	Throughout bathrooms, Room 34	Intact		
Wall panel glue	Room 20 (250 SF), 136B (40 SF),	Intact		
Electrical panel components	Room 51B, Mech Room 845	Intact		
Bulletin board/marker board glue daubs	Corridors 404, 408, 416, Rooms 101, 124, 601, 818, 825 & 826	Intact		
Interior metal wall panel components	Rooms 114, 124 & 125	Intact		
Glue/grout associated with ceramic wall/floor tiles	Room 167	Intact		
Insulation/sealant on underside of serving area	Serving 319	Intact		
Insulation/sealant on underside of dishwashing area	Room 342	Intact		
Insulation/sealant in wall/floor/ceiling of refrigerator units	Foyer 346 - refrigerators	Intact		
Counter backsplash glue	Room 419	Intact		

**PERIODIC SURVEILLANCE FORM
THE GBCMHC BUILDING
BRIDGEPORT, CONNECTICUT**

Material	General Location	Previous Condition	Current Condition	Date
Glue behind carpet pin boards on walls	Room 618	Intact		
2'x4' and 2'x2' white long squiggly w/ pinholes and red back ceiling tile (some tiles have vent openings) (CT2A, CT2 (2/15))	Corridor 6, 31, 37, 43, 114, 144, 146, 165, 216, 221, 224, 240, 247, 325, 332, 337, 338, 416, 423, 424, 440, 448, 516, 524, 532, 536, 550, 636, 650 3 rd floor-connector Room 29, 30, 106, 115, 117, 124, 125, 126A&B, 127, 151, 158-163, 164, 169, 170, 201, 205-214, 217, 219, 225, 227, 231, 233, 238, 245B, 254-256, 303-306, 308, 313A-C, 314A-C, 334, 336, 403-408, 413A-C, 414A-C, 418, 419, 428-438, 445-447, 457, 503, 504, 506-508, 519A, 527, 560, 562, 605-607, 609, 612, 626, 660, 705, 709, 712, 806-808, 860	Intact		

APPENDIX I

**RECORDS OF ASBESTOS ABATEMENT ACTIVITY OR
OTHER RESPONSE ACTIONS**

APPENDIX J

FLOOR PLANS

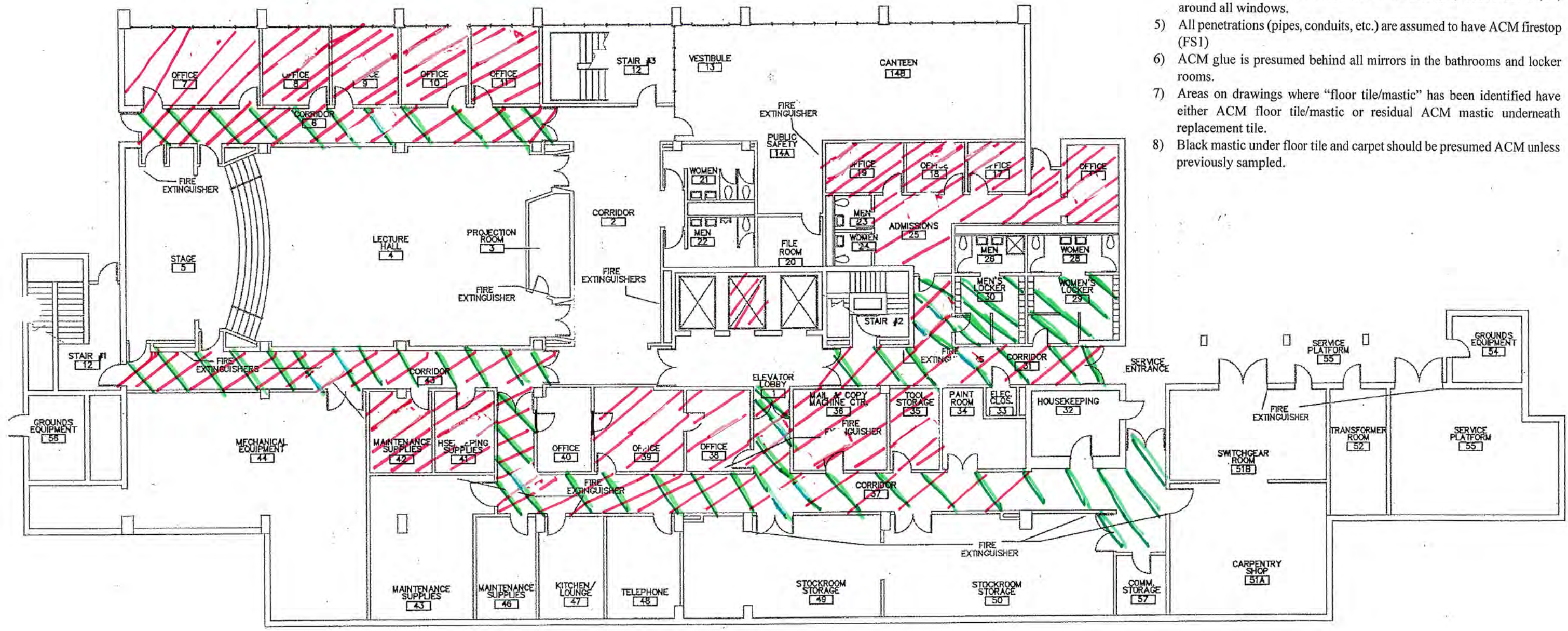
SAFETY PROGRAM OFFICER

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
 /// = Ceiling Tile

General Asbestos Notes (applies to all drawings/floors)

- 1) All doors assumed to have ACM Fire door insulation.
- 2) All cloth covered Mudded Fittings (MF4, MF5, MF6) are presumed ACM unless individually sampled to prove otherwise.
- 3) All light grey mudded fittings (MF2) with no cloth covering are presumed ACM unless individually sampled to prove otherwise.
- 4) All exterior windows have an interior ACM window glazing (WG4, WG5) with the exception of the ground floor windows on the rear side of the building. In addition, there is exterior grey ACM caulk (C9) around all windows.
- 5) All penetrations (pipes, conduits, etc.) are assumed to have ACM firestop (FS1)
- 6) ACM glue is presumed behind all mirrors in the bathrooms and locker rooms.
- 7) Areas on drawings where "floor tile/mastic" has been identified have either ACM floor tile/mastic or residual ACM mastic underneath replacement tile.
- 8) Black mastic under floor tile and carpet should be presumed ACM unless previously sampled.



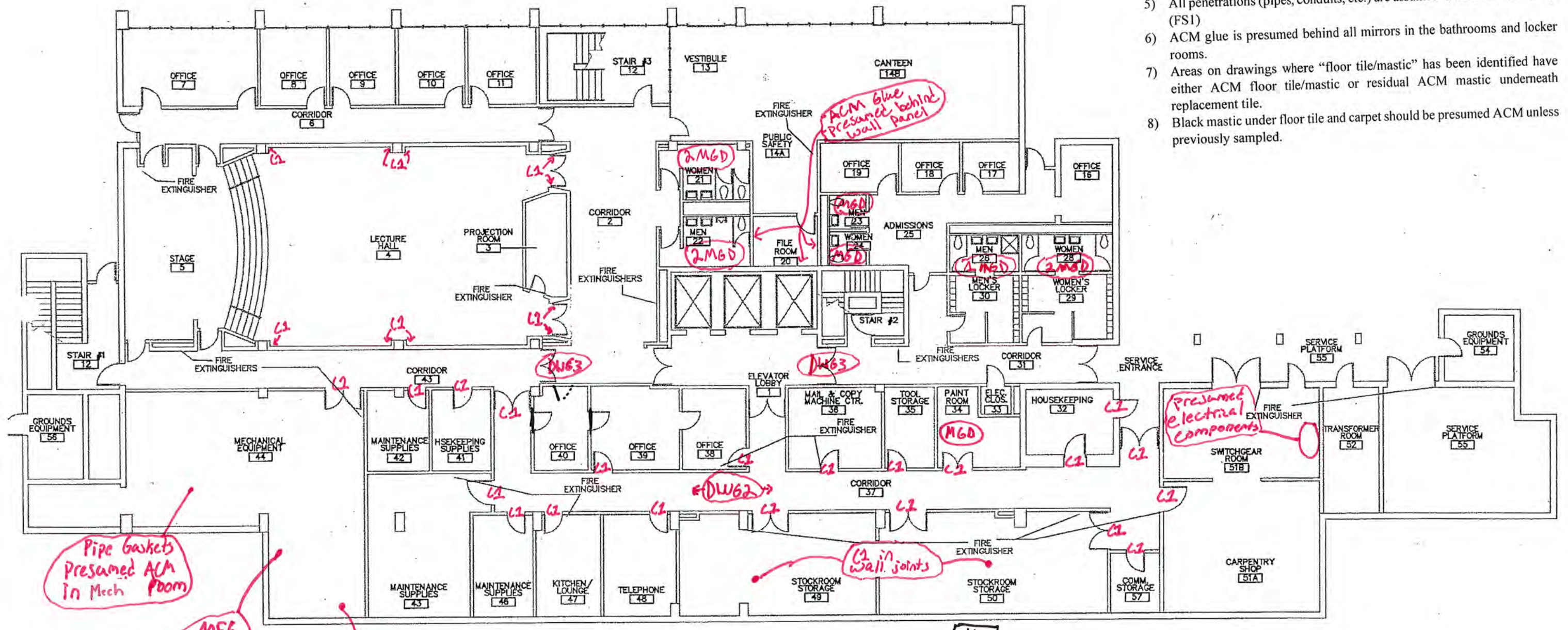
GROUND FLOOR A

SAFETY PROGRAM OFFICER

All Other ACM

General Asbestos Notes (applies to all drawings/floors)

- 1) All doors assumed to have ACM Fire door insulation.
- 2) All cloth covered Mudded Fittings (MF4, MF5, MF6) are presumed ACM unless individually sampled to prove otherwise.
- 3) All light grey mudded fittings (MF2) with no cloth covering are presumed ACM unless individually sampled to prove otherwise.
- 4) All exterior windows have an interior ACM window glazing (WG4, WG5) with the exception of the ground floor windows on the rear side of the building. In addition, there is exterior grey ACM caulk (C9) around all windows.
- 5) All penetrations (pipes, conduits, etc.) are assumed to have ACM firestop (FS1)
- 6) ACM glue is presumed behind all mirrors in the bathrooms and locker rooms.
- 7) Areas on drawings where "floor tile/mastic" has been identified have either ACM floor tile/mastic or residual ACM mastic underneath replacement tile.
- 8) Black mastic under floor tile and carpet should be presumed ACM unless previously sampled.



GROUND FLOOR B

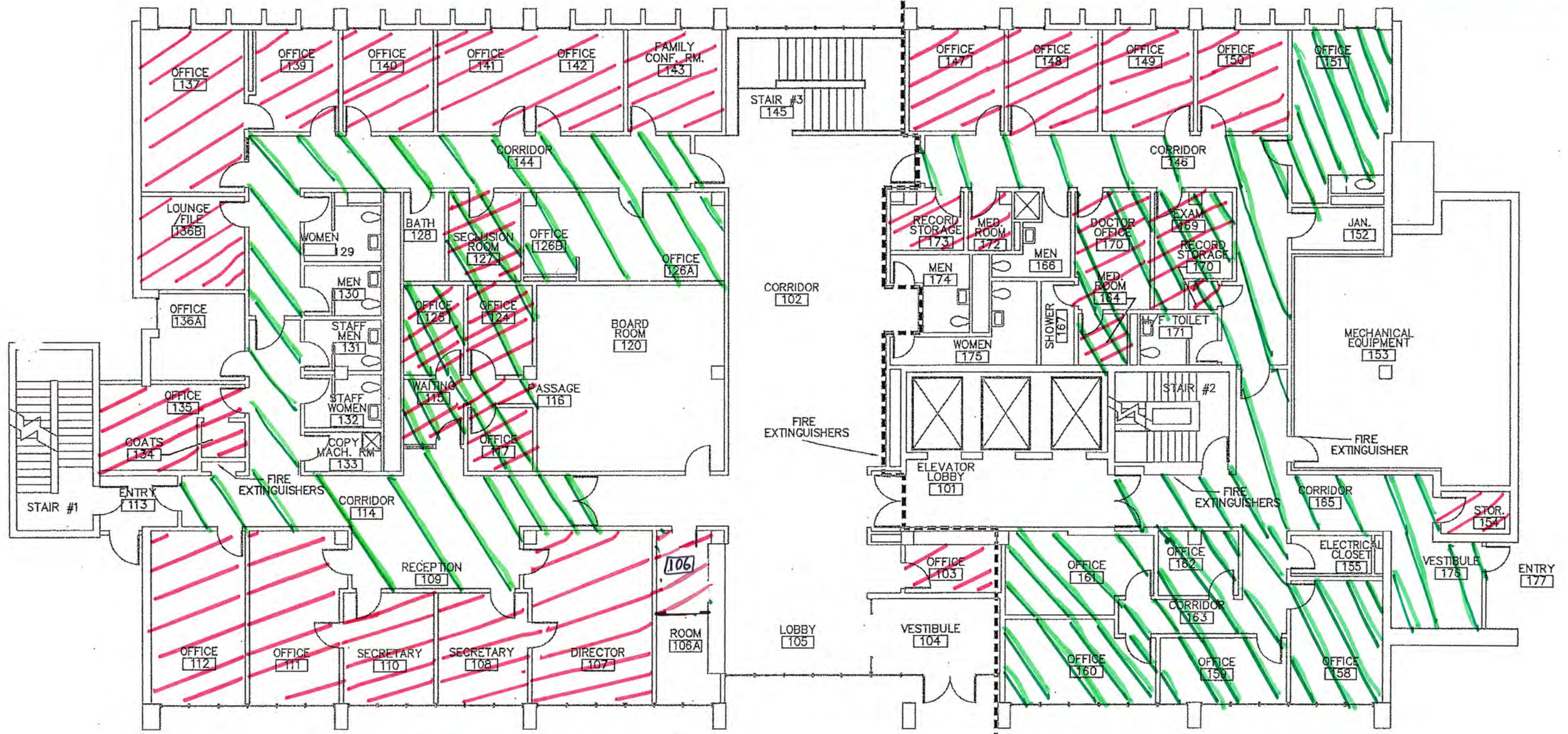
Key
 MGD = mirror glue dabs
 C# = caulk
 DWG# = Door Window Glaze

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
//// = Ceiling Tile

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****

SMOKE ZONE #1



1ST FLOOR A

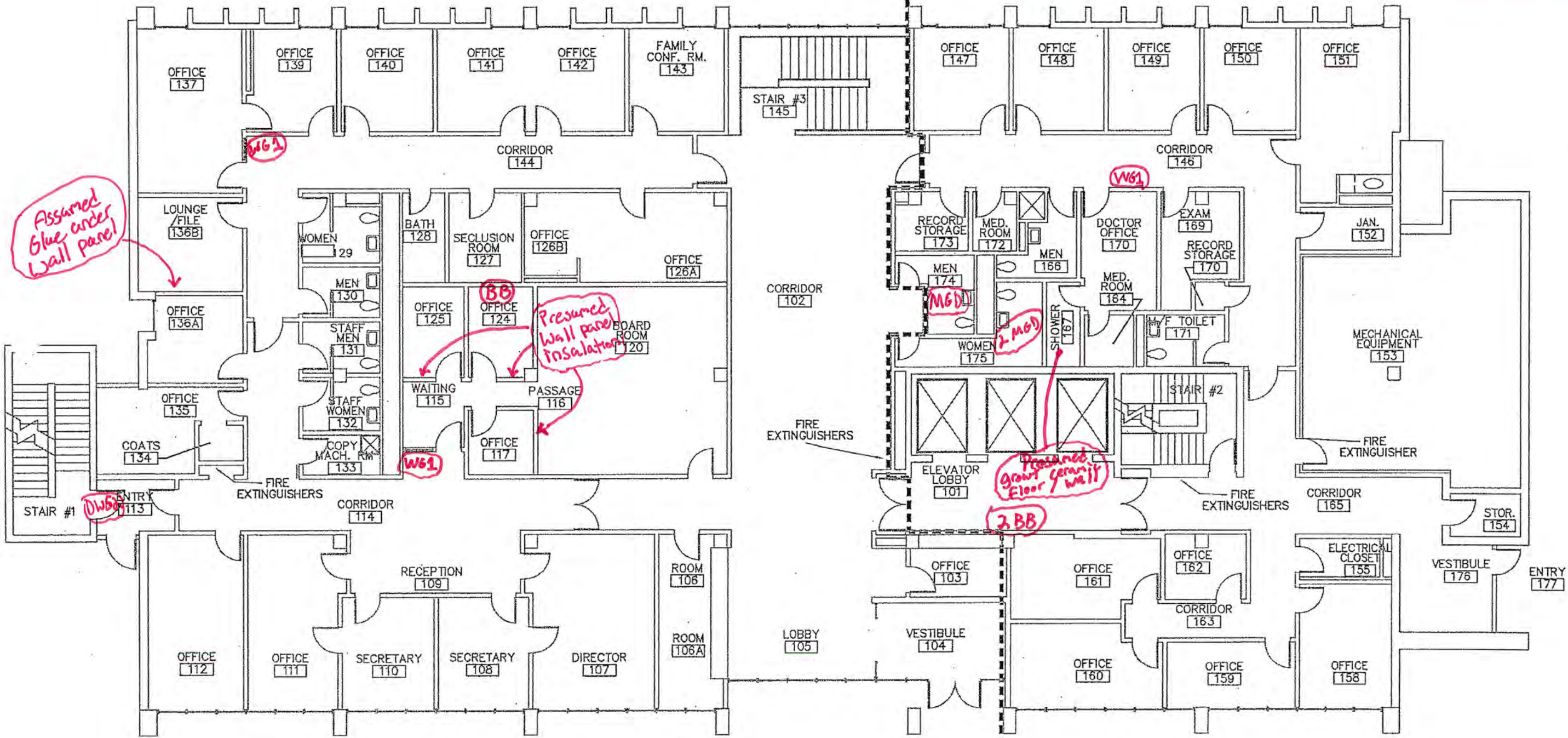
SMOKE ZONE #1

SMOKE ZONE #2

All Other ACM

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****

SMOKE ZONE #1 ← → SMOKE ZONE #2



1ST FLOOR B

SMOKE ZONE #1 ← → SMOKE ZONE #2

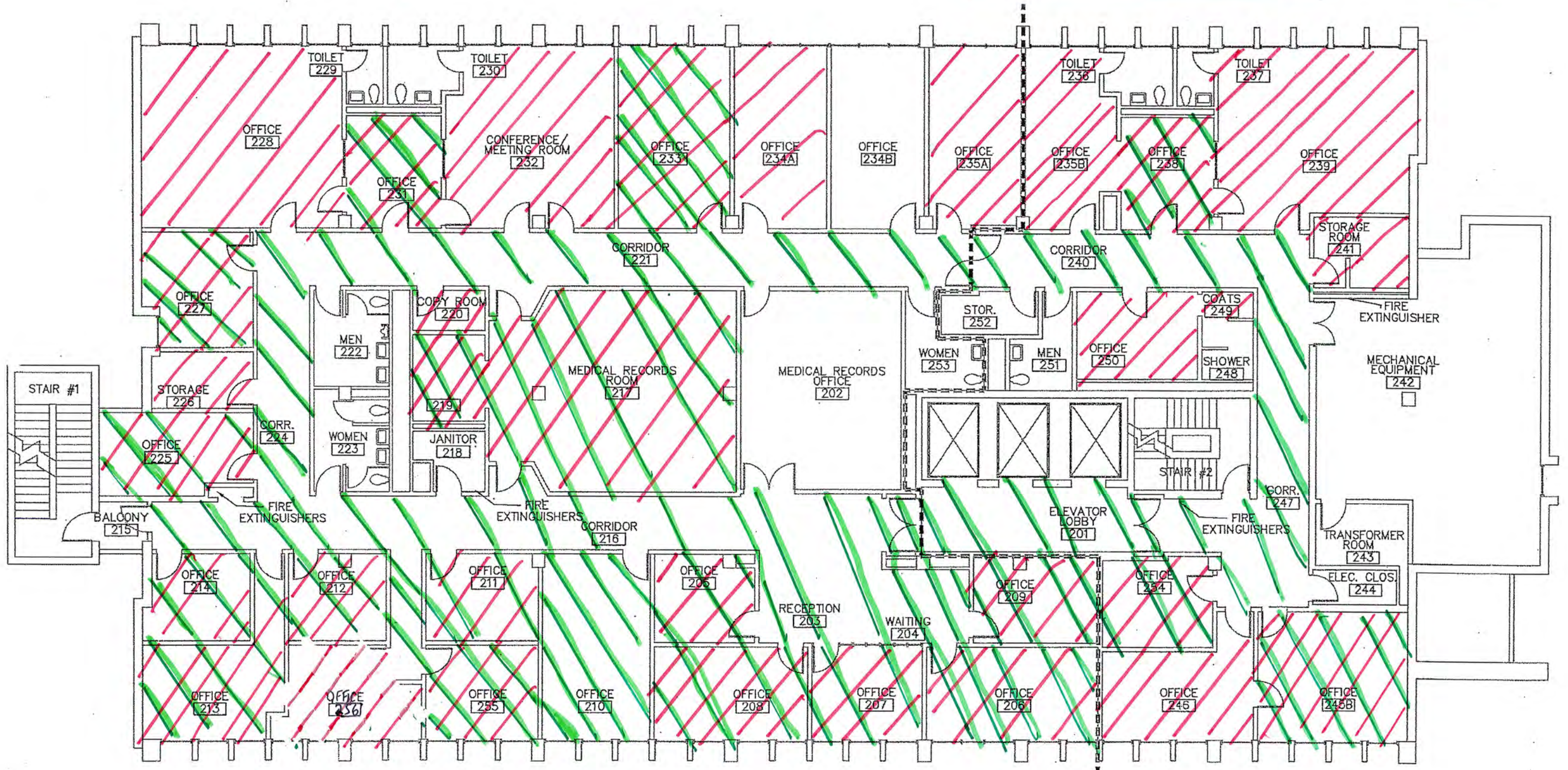
- Key**
- BB = Bulletin Board
 - MGD = Mirror Glue Daub
 - W6# = Window glaz
 - DWG# = Door Window Glaz

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
/// = Ceiling Tile

SMOKE ZONE #1

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



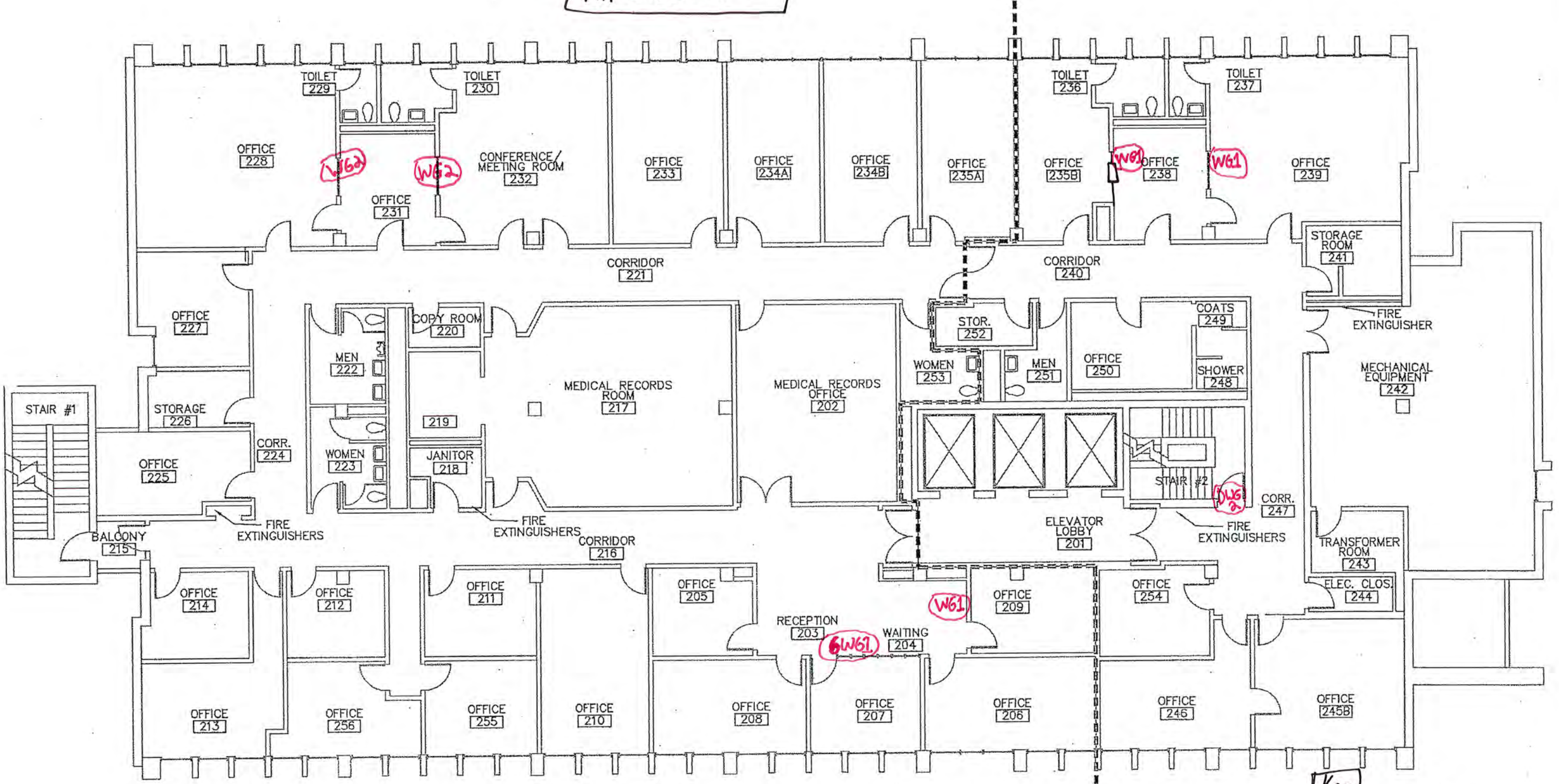
2ND FLOOR A

SMOKE ZONE #1 ————— SMOKE ZONE #2

All Other ACM

SMOKE ZONE #1

General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.



2ND FLOOR B

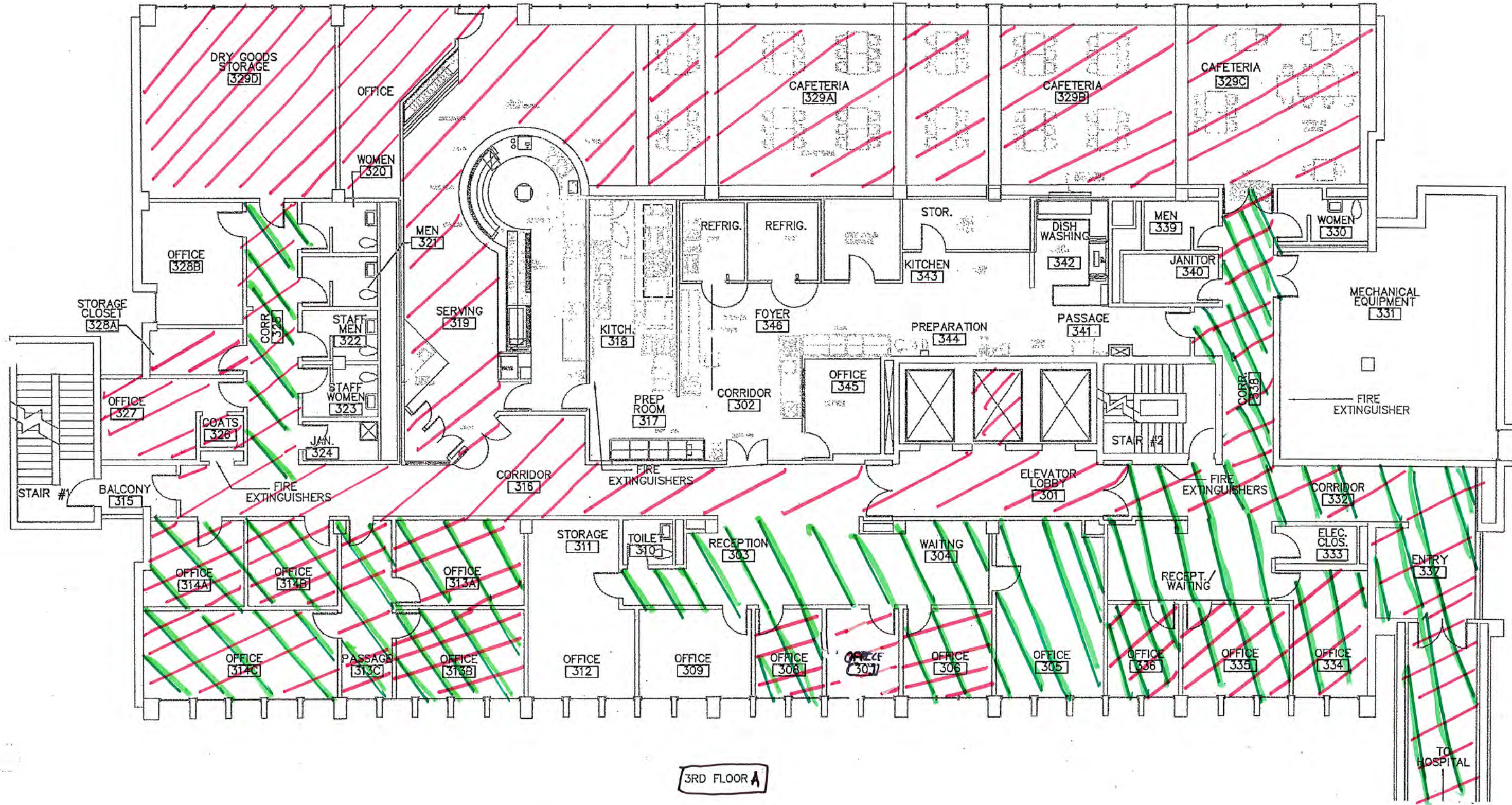
SMOKE ZONE #1 ————— SMOKE ZONE #2

Key
 W6# = Window Glaze
 DW6# = Door Window Glaze

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
/// = Ceiling Tile

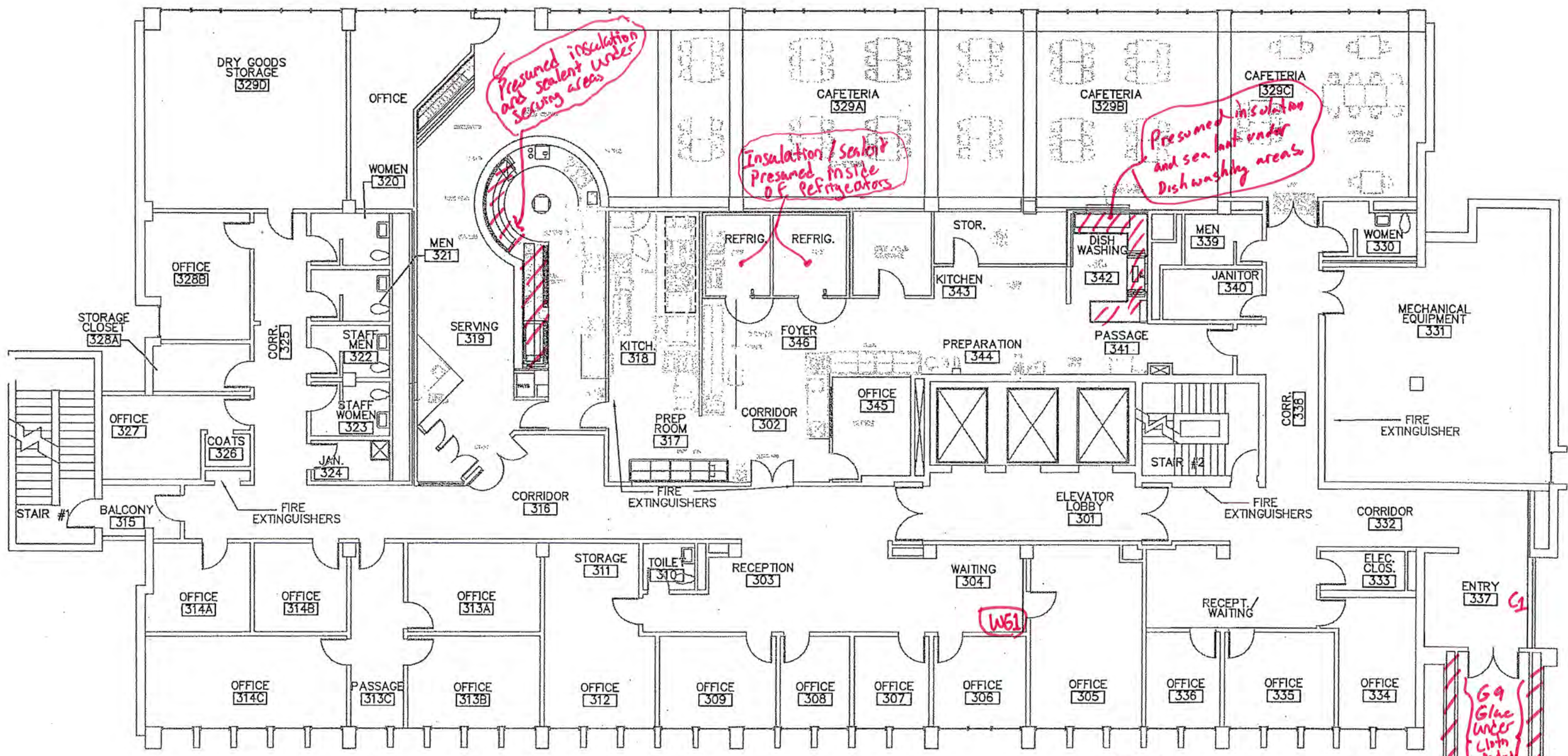
****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



3RD FLOOR A

All Other ACM

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



3RD FLOOR B

Key

W6# = Window Glaze
C# = caulk

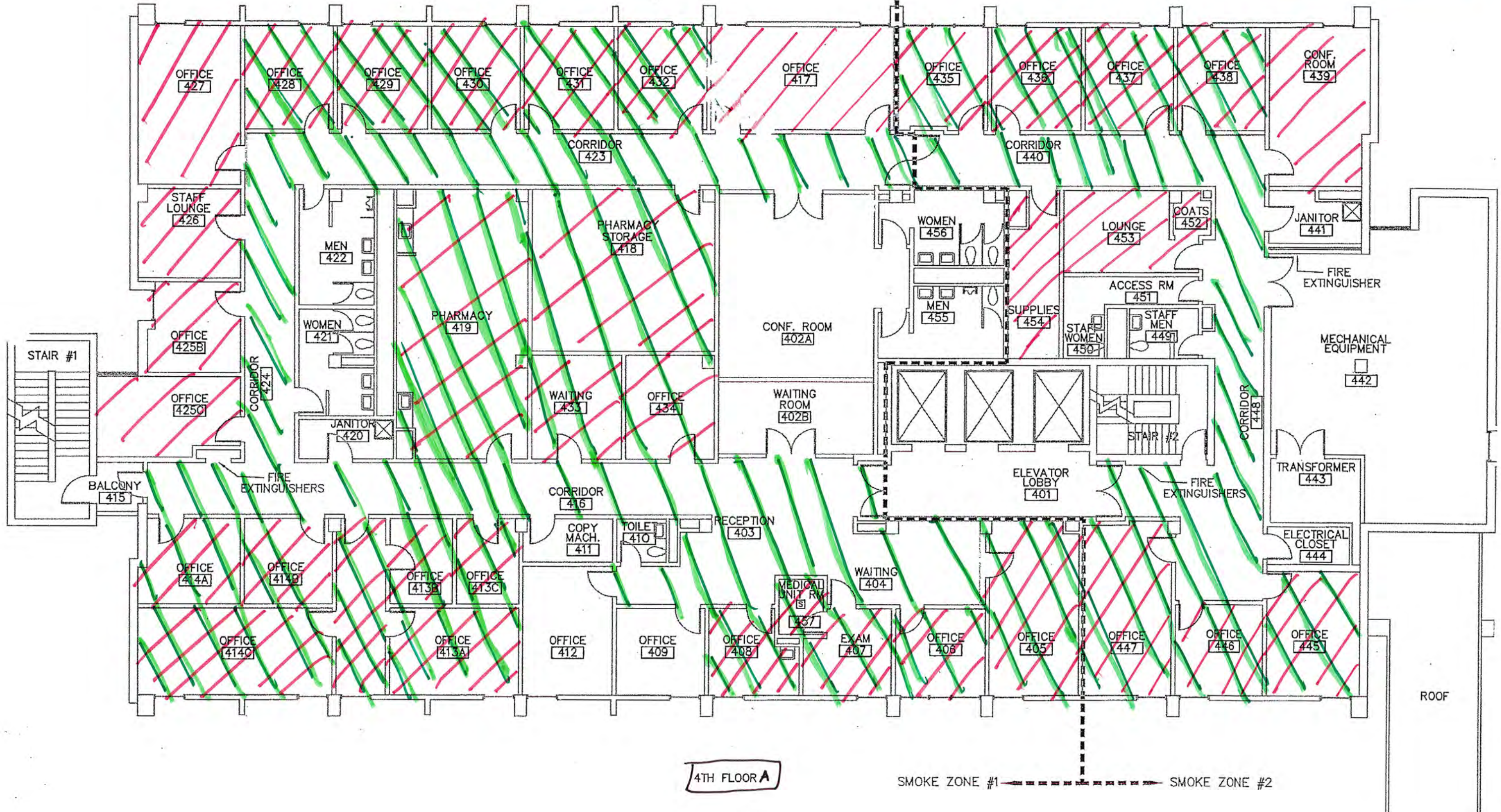
69
Glue
under
window
sills
to
hospital
and
potentially
sections
of
walls

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
/// = Ceiling Tile

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****

SMOKE ZONE #1



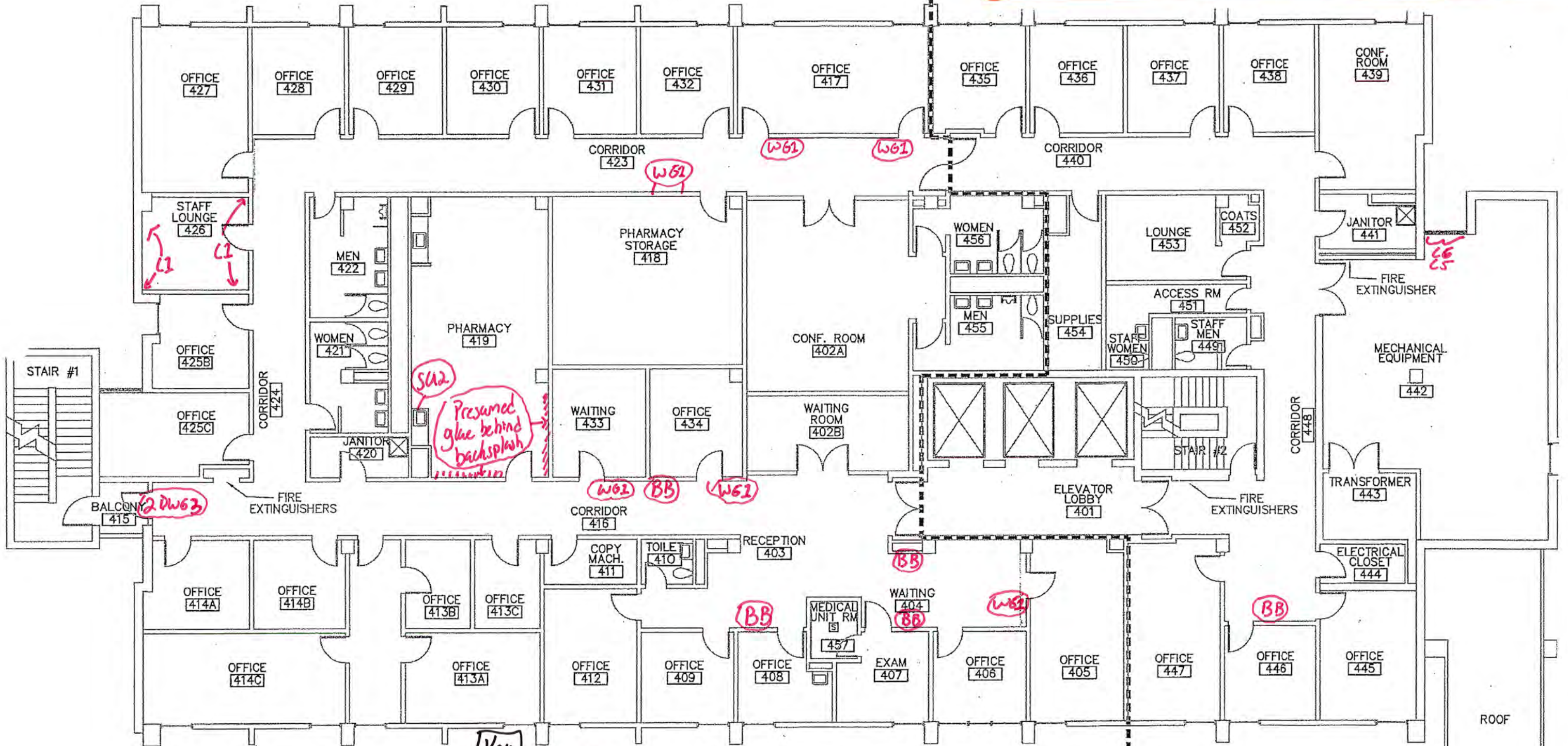
4TH FLOOR A

SMOKE ZONE #1 SMOKE ZONE #2

All Other ACM

SMOKE ZONE #1

General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.



Key
 W6# = window glaze
 BB = Bulletin Board
 C# = caulk

4TH FLOOR B

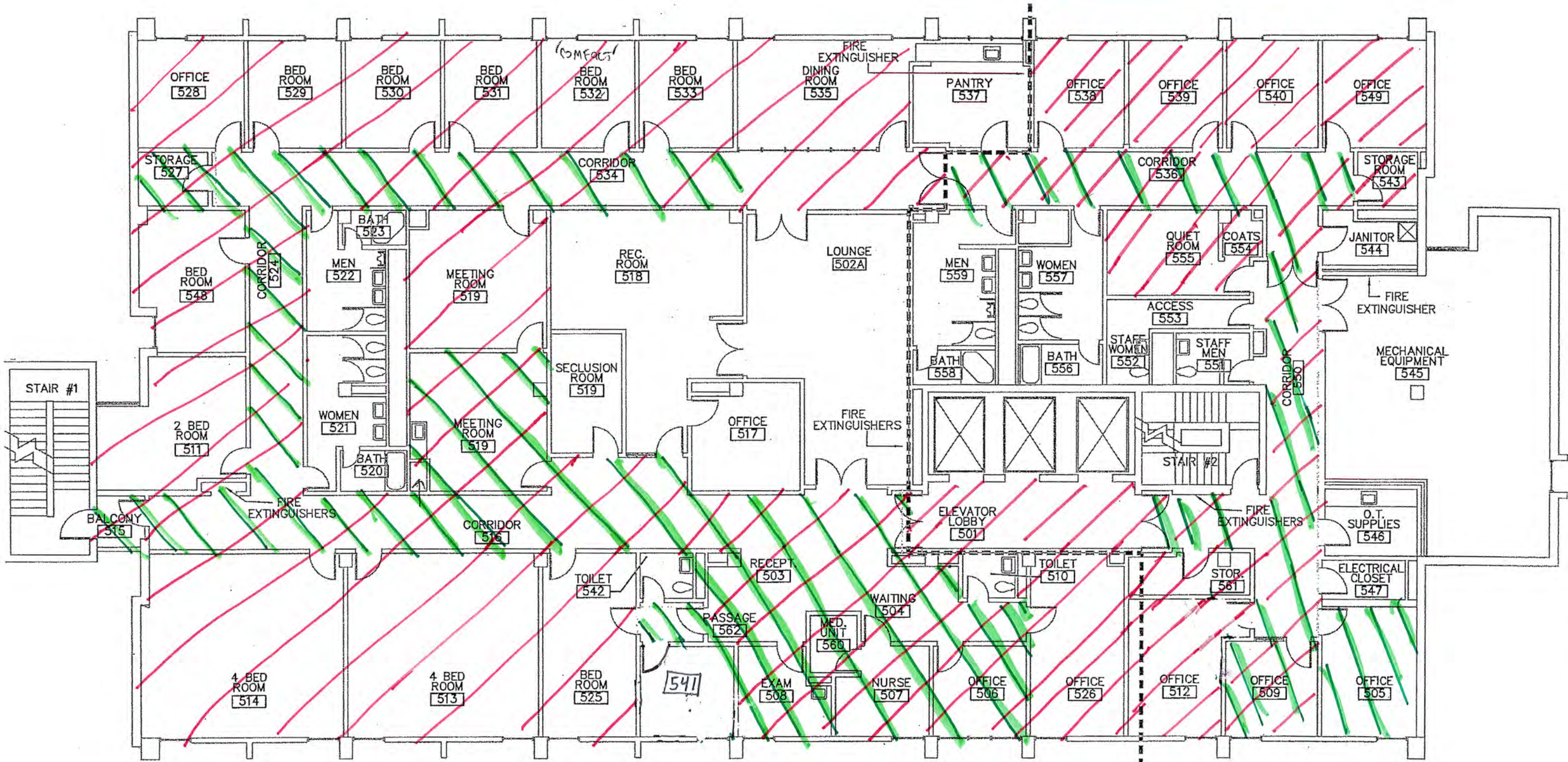
SMOKE ZONE #1 SMOKE ZONE #2

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
//// = Ceiling Tile

SMOKE ZONE #1 -

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



5TH FLOOR A

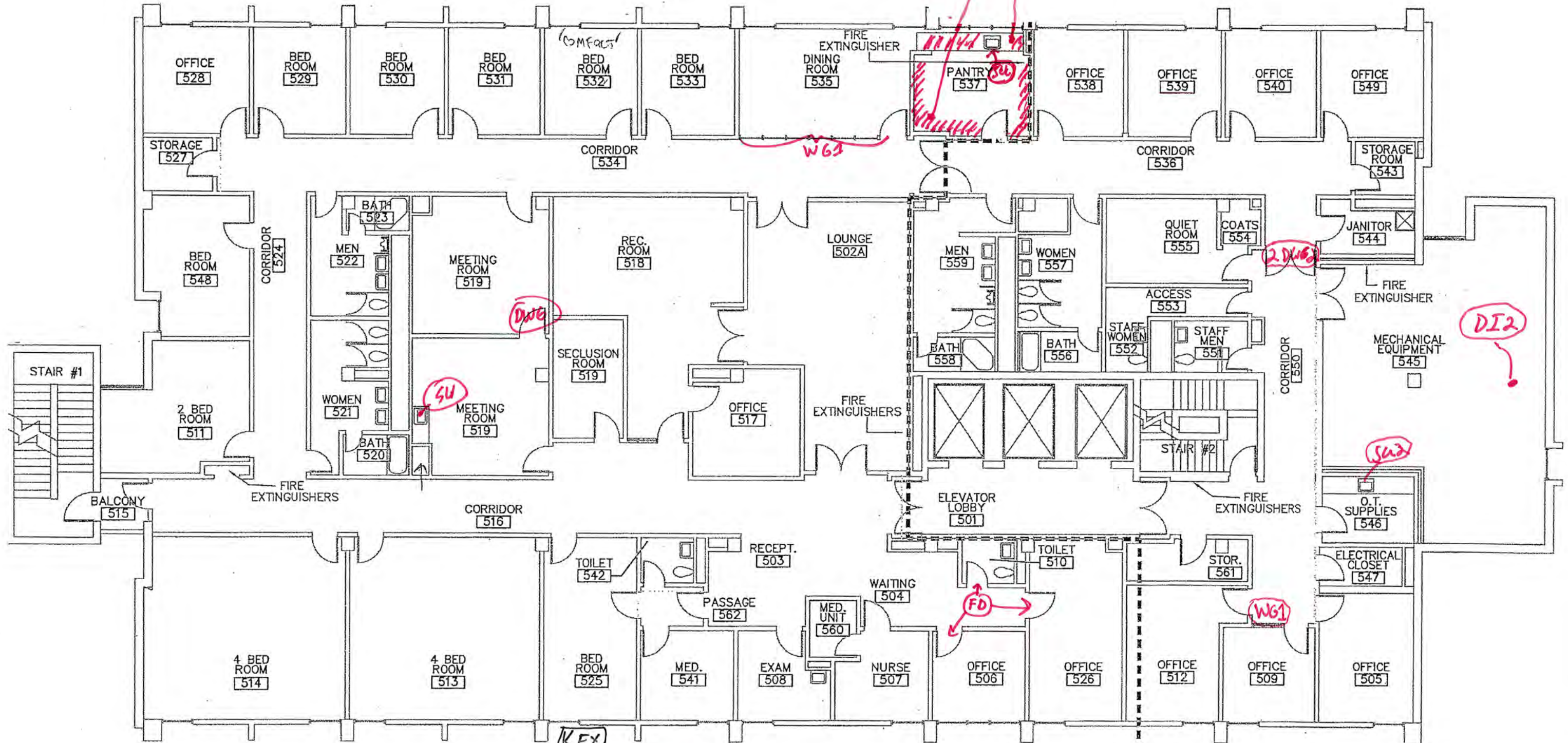
SMOKE ZONE #1 ← → SMOKE ZONE #2

All Other ACM

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****

WCU1 under countertops

SMOKE ZONE #1 ← → SMOKE ZONE #2



(KEY)

- FD = Fire door Insulation
- W6# = Window Glazing
- DWG# = Door Window Glazing
- SU = sink undercounting

5TH FLOOR B

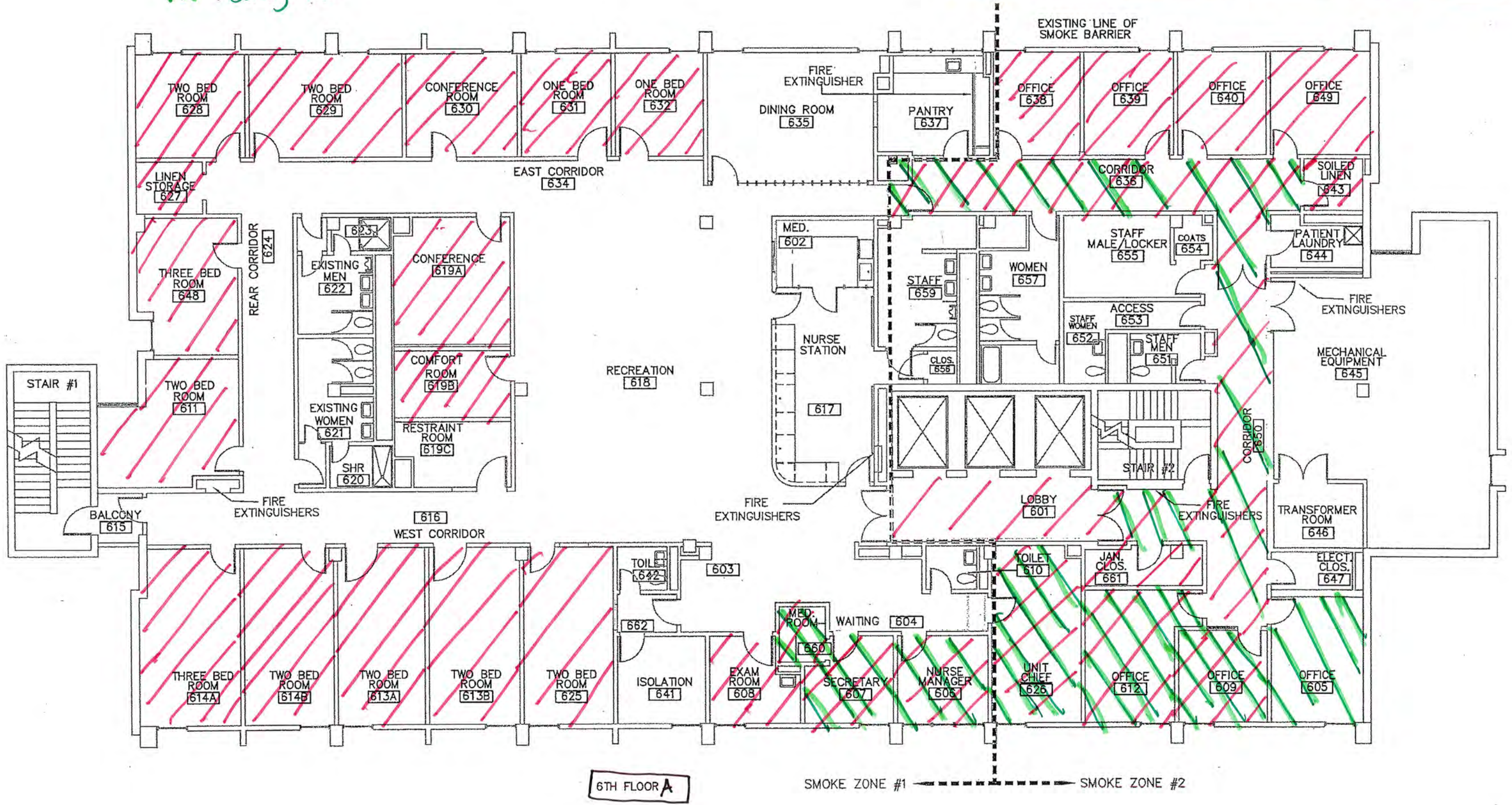
SMOKE ZONE #1 ← → SMOKE ZONE #2

ACM Floor Tile and Ceiling Tile

/// = Floor Tile/Mastic
 \\\ = Ceiling Tile

SMOKE ZONE #1

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



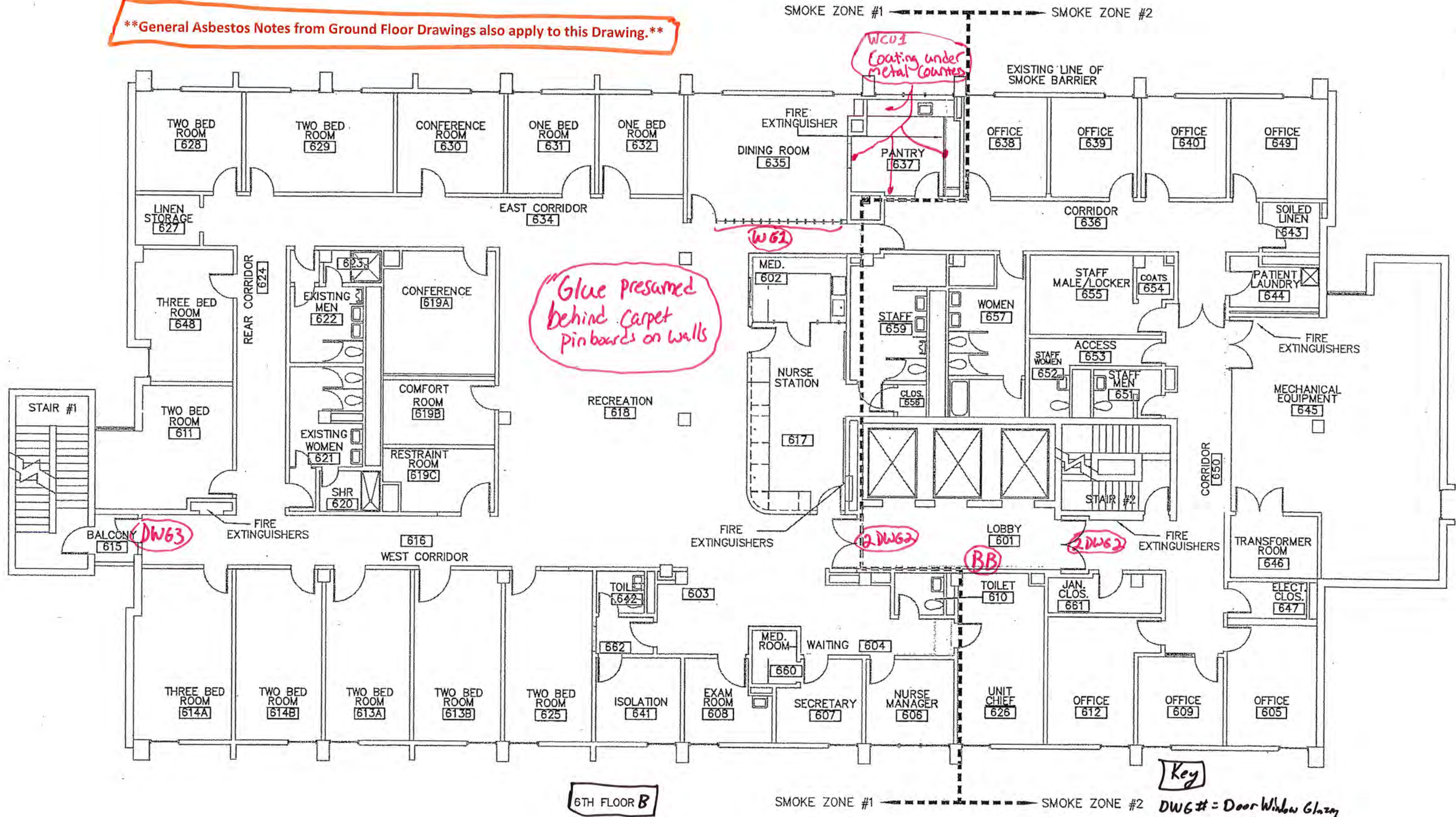
6TH FLOOR A

SMOKE ZONE #1

SMOKE ZONE #2

All Other ACM

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



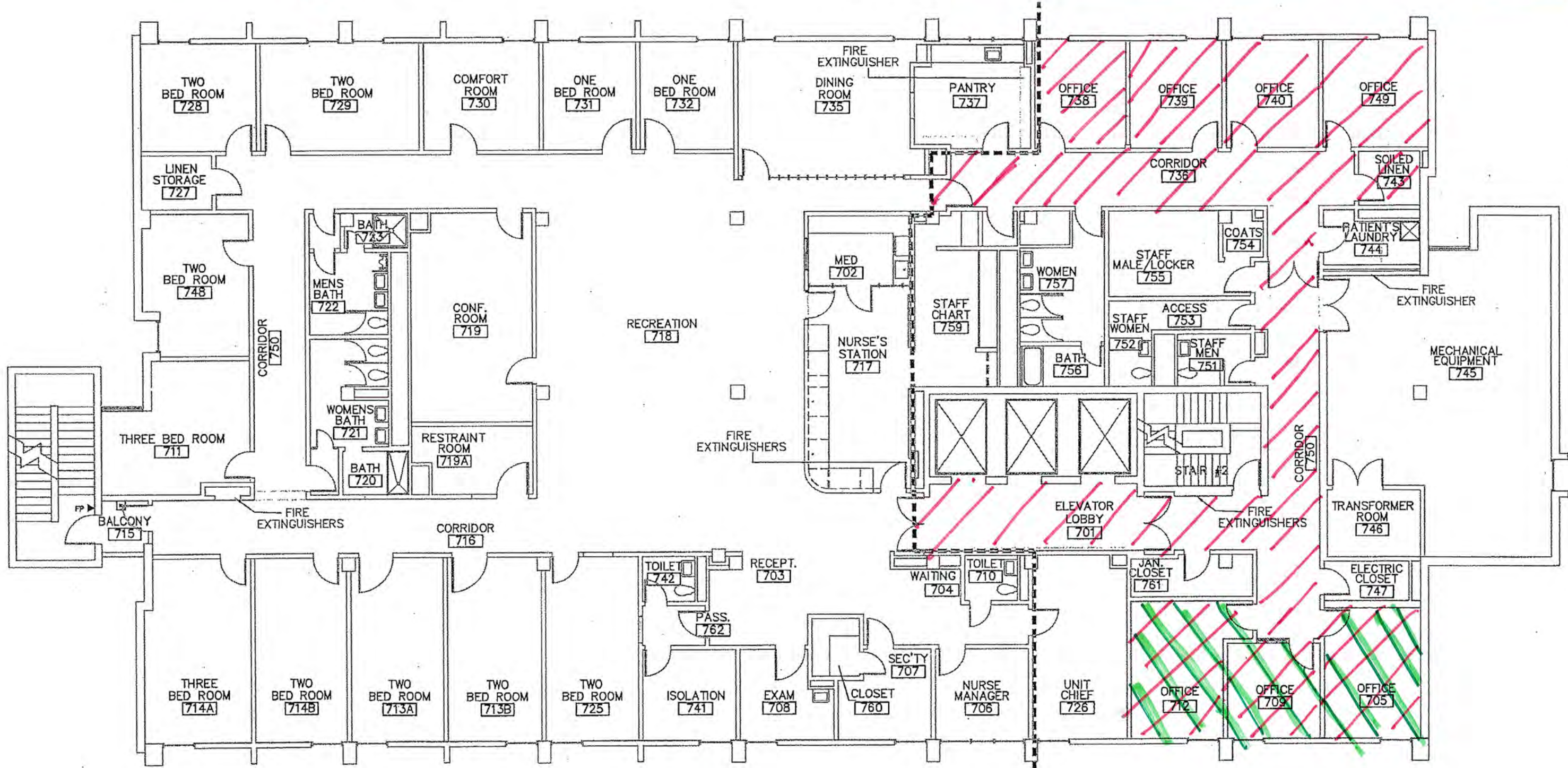
Key
 DW6# = Door Window Glazing
 BB = Bulletin Board
 WG# = Window Glazing

ACM Floor Tile + Ceiling Tile

/// = Floor Tile/Mastic
 \\\ = Ceiling Tile

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****

SMOKE ZONE #1



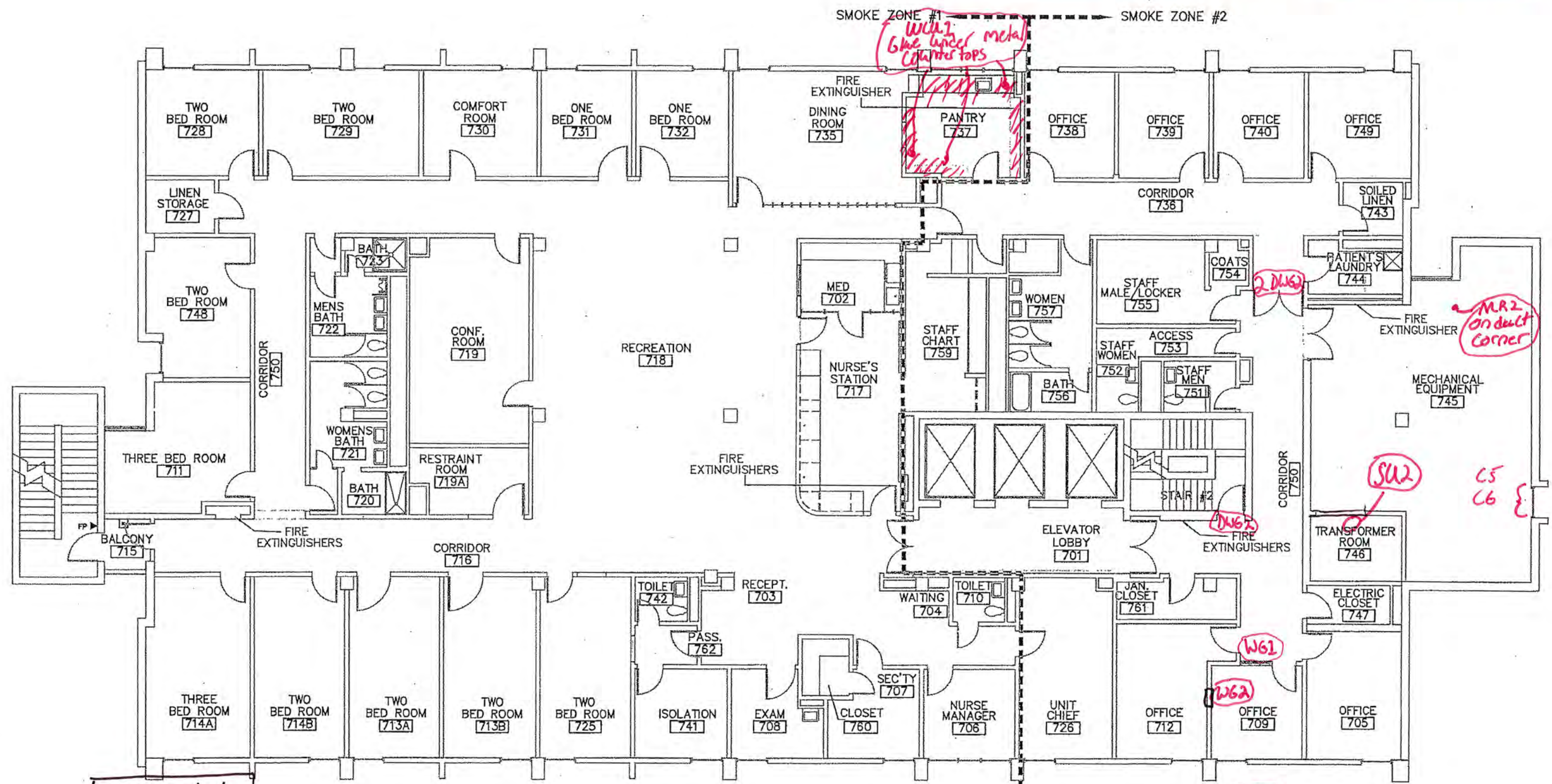
7TH FLOOR A

SMOKE ZONE #1

SMOKE ZONE #2

All Other ACM

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



7th floor Note

① All upper windows (many above ceilings) have ACM Window Glazing (W63) on interior.

7TH FLOOR B

Key

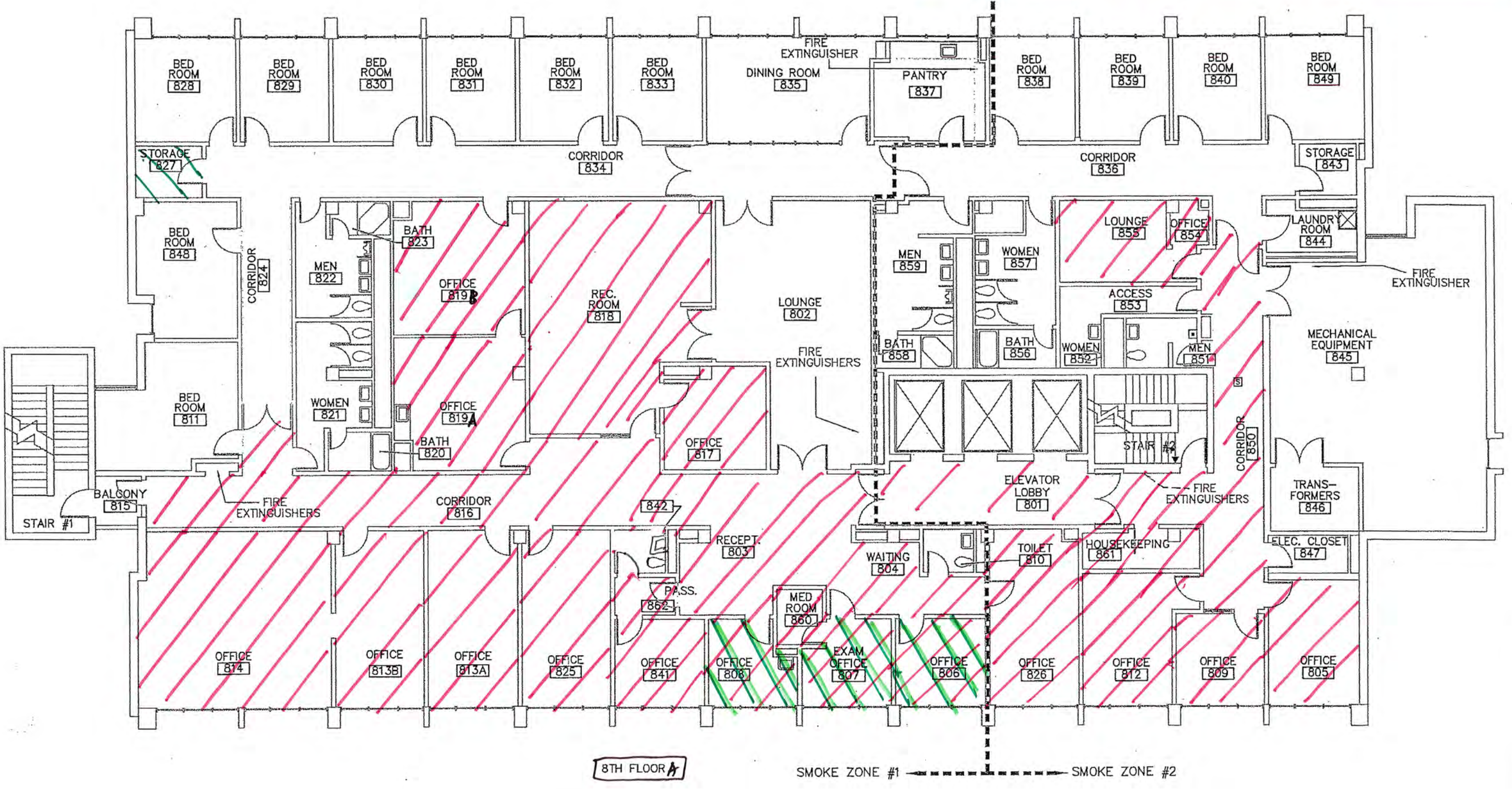
W6# = Window Glazing
 DW6# = Door Window Glazing
 C# = Caulk

SMOKE ZONE #1 ← → SMOKE ZONE #2

ACM Floor Tile and Ceiling Tile

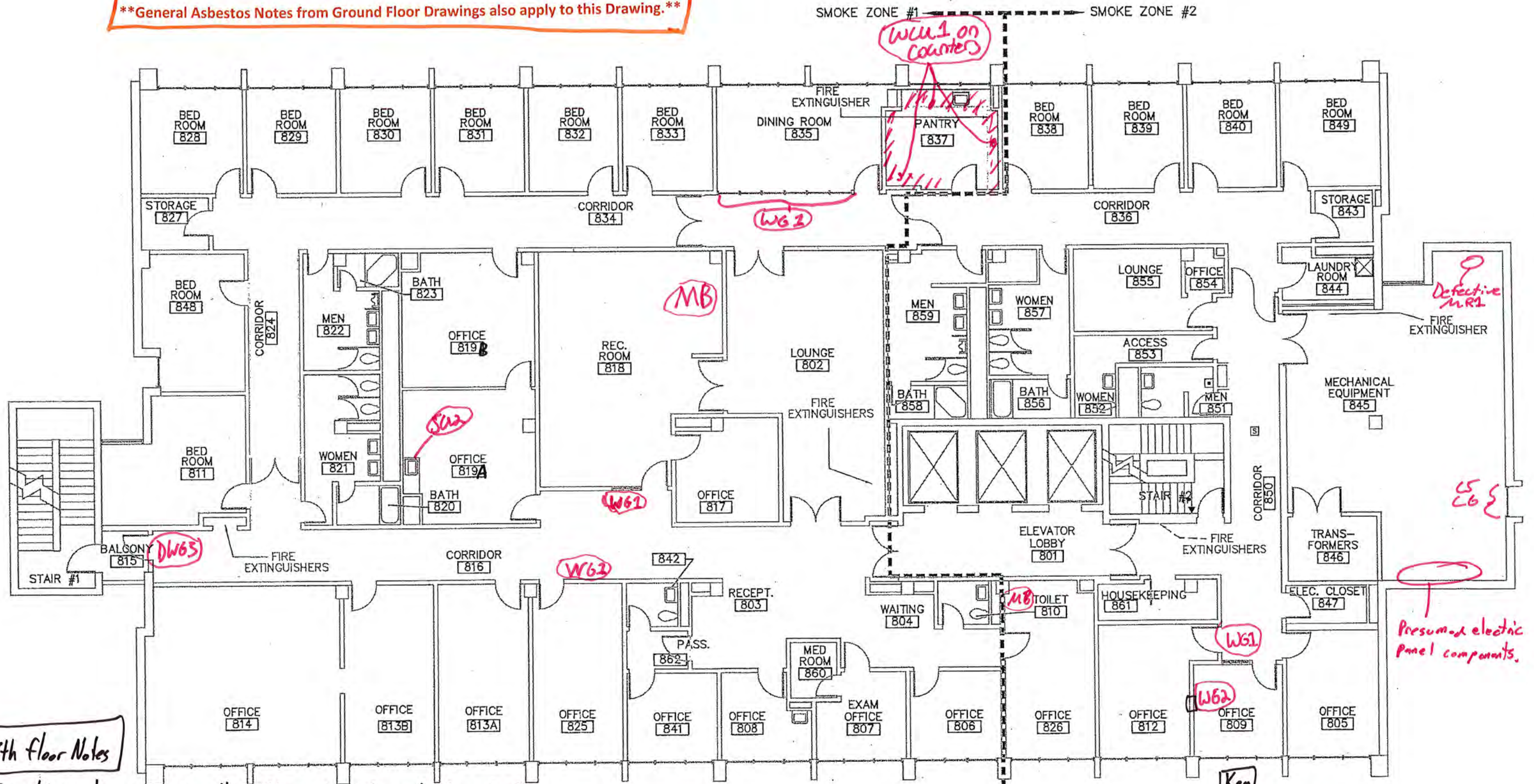
/// = Floor Tile
/// = Ceiling Tile

SMOKE ZONE #1 - ****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



All Other ACM

****General Asbestos Notes from Ground Floor Drawings also apply to this Drawing.****



8th floor Notes

- ① Tan skimcoat associated with SHRY was found to contain trace levels of Chrysotile (<1%) in Room 802. Although not an Asbestos - Containing Material, OSHA Regulations would apply if the material is impacted as part of any renovation or demolition activities.
- ② Roof drains are presumed to have ACM insulation.

8TH FLOOR B

Key
 MB = Marker Board
 W6# = Window Glaziy
 DW6# = Door Window Glaziy
 C# = Caulk

SMOKE ZONE #1 ← → SMOKE ZONE #2

APPENDIX K

MEDICAL SURVEILLANCE FORM

APPENDIX L

**ASBESTOS LABORATORY ANALYSIS
DATA**



BULK ASBESTOS ANALYSIS REPORT

CLIENT: CT Department of Construction Services

Lab Log #: 0047320
 Project #: 244600.0001.0000
 Date Received: 01/08/2016
 Date Analyzed: 01/18/2016

Site: Bridgeport Mental Health Center, Bridgeport, CT

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
01	Light Grey	Yes	No	--	80% mineral wool	ND	None
02	Light Grey	Yes	No	--	80% mineral wool	ND	None
03	Light Grey	Yes	No	--	80% mineral wool	ND	None
04	Light Grey	Yes	No	--	80% mineral wool	ND	None
05	Light Grey	Yes	No	--	80% mineral wool	ND	None
06	Light Grey	Yes	No	--	80% mineral wool	ND	None
07	Light Grey	Yes	No	--	80% mineral wool	ND	None
08	Light Grey	Yes	No	--	80% mineral wool	ND	None
09	Light Grey	Yes	No	--	80% mineral wool	ND	None
10	Light Grey	Yes	No	--	80% mineral wool	ND	None
11	Light Grey	Yes	No	--	80% mineral wool	ND	None
12	Light Grey	Yes	No	--	80% mineral wool	ND	None
13	Light Grey	Yes	No	--	80% mineral wool	Trace	Chrysotile
14	Light Grey	Yes	No	--	80% mineral wool	2%	Chrysotile
15	Light Grey	Yes	No	--	80% mineral wool	ND	None
16	Light Grey	Yes	No	--	80% mineral wool	ND	None
17	Light Grey	Yes	No	--	80% mineral wool	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP, LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
18	Light Grey	Yes	No	--	80% mineral wool	ND	None
19	Light Grey	Yes	No	--	80% mineral wool	ND	None
20	Light Grey	Yes	No	--	80% mineral wool	ND	None
21	Light Grey	Yes	No	--	80% mineral wool	ND	None
22	Light Grey	Yes	No	--	80% mineral wool	ND	None
23	Light Grey	Yes	No	--	80% mineral wool	ND	None
24	Light Grey	Yes	No	--	80% mineral wool	ND	None
25	Light Grey	Yes	No	--	80% mineral wool	ND	None
26	Light Grey	Yes	No	--	80% mineral wool	ND	None
27	Light Grey	Yes	No	--	80% mineral wool	ND	None
28	Light Grey	Yes	No	--	80% mineral wool	ND	None
29	Light Grey	Yes	No	--	80% mineral wool	ND	None
30	Light Grey	Yes	No	--	80% mineral wool	ND	None
31	Light Grey	Yes	No	--	80% mineral wool	ND	None
32	Light Grey	Yes	No	--	80% mineral wool	ND	None
33	Light Grey	Yes	No	--	80% mineral wool	ND	None
34	Light Grey	Yes	No	--	80% mineral wool	ND	None
35	Light Grey	Yes	No	--	80% mineral wool	ND	None
36	Light Grey	Yes	No	--	80% mineral wool	ND	None
37	Light Grey	Yes	No	--	80% mineral wool	ND	None
38	Light Grey	Yes	No	--	80% mineral wool	ND	None
39	Light Grey	Yes	No	--	80% mineral wool	ND	None
40	Light Grey	Yes	No	--	80% mineral wool	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0	AIHA-LAP,LLC #100122	CT #PH-0426	ME LA-0075, LB-0071	MA #AA000052	NY #10980	WV# LT000411
RI #AAL-007	TX #300354	VT #AL014538	LA#05011	VA #3333 000283	AZ #A20944	HI #L-09-004
CO# AL-15020	PHIL# 461	PA#68-03387			NJ #CT004	CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
41	Light Grey	Yes	No	--	80% mineral wool	ND	None
42	Light Grey	Yes	No	--	80% mineral wool	Trace	Chrysotile
43	Light Grey	Yes	No	--	80% mineral wool	ND	None
44	Light Grey	Yes	No	--	80% mineral wool	ND	None
45	Light Grey	Yes	No	--	80% mineral wool	ND	None
46	Light Grey	Yes	No	--	80% mineral wool	ND	None
47	Light Grey	Yes	No	--	80% mineral wool	ND	None
48	Grey	Yes	No	--	---	60%	Chrysotile
49	Light Grey	Yes	No	--	80% mineral wool	ND	None
50	Light Grey	Yes	No	--	80% mineral wool	ND	None
51	Light Grey	Yes	No	--	80% mineral wool	ND	None
52	Light Grey	Yes	No	--	80% mineral wool	ND	None
53	Light Grey	Yes	No	--	80% mineral wool	ND	None
54	Light Grey	Yes	No	--	80% mineral wool	ND	None
55	Light Grey	Yes	No	--	80% mineral wool	ND	None
56	Light Grey	Yes	No	--	80% mineral wool	ND	None
57	Light Grey	Yes	No	--	80% mineral wool	ND	None
58	Light Grey	Yes	No	--	80% mineral wool	ND	None
59	White	Yes	No	--	---	60%	Chrysotile
60	--	--	--	--	--	NA/PS	--
61	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None
62	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0	AIHA-LAP, LLC #100122	CT #PH-0426	ME LA-0075, LB-0071	MA #AA000052	NY #10980	WV# LT000411
RI #AAL-007	TX #300354	VT #AL014538	LA#05011	VA #3333 000283	AZ #A20944	III #L-09-004
CO# AL-15020	PHIL# 461	PA#68-03387			NJ #CT004	CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
63	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None
64	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None
65	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None
66	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None
67	White	Yes	No	--	90% 2% mineral wool cellulose	ND	None
68	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
69	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
70	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
71	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
72	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
73	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
74	White	Yes	No	--	80% 10% mineral wool cellulose	ND	None
75	White	Yes	No	--	20% 60% mineral wool cellulose	ND	None
76	White	Yes	No	--	20% 60% mineral wool cellulose	ND	None
77	White	Yes	No	--	20% 60% mineral wool cellulose	ND	None
78	White	Yes	No	--	20% 60% mineral wool cellulose	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVI AP Lab Code 101424-0	AIHA-LAP, LLC #100122	CT #PH-0426	ME LA-0075, LB-0071	MA #AA000052	NY #10980	WV# LT000411
RI #AAL-007	TX #300354	VT #AL014538	LA#05011	VA #3333 000283	AZ #A20944	HI #L-09-004
CO# AL-15020	PHIL# 461	PA#68-03387				NJ #CT004
						CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
79	White	Yes	No	--	20% mineral wool 60% cellulose	ND	None
80	White	Yes	No	--	95% mineral wool	ND	None
81	White	Yes	No	--	95% mineral wool	ND	None
82	White	Yes	No	--	60% mineral wool 20% cellulose	ND	None
83	White	Yes	No	--	60% mineral wool 20% cellulose	ND	None
84	White	Yes	No	--	40% mineral wool 40% cellulose	ND	None
85	White	Yes	No	--	40% mineral wool 40% cellulose	ND	None
86	White	Yes	No	--	40% mineral wool 40% cellulose	ND	None
87	White	Yes	No	--	40% mineral wool 40% cellulose	ND	None
88	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
89	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
90	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
91	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
92	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
93	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
94	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0	AIHA-LAP, LLC #100122	CT #PH-0426	ME LA-0075, LB-0071	MA #AA000052	NY #10980	WV# LT000411
RI #AAL-007	TX #300354	VT #AL014538	LA#05011	VA #3333 000283	AZ #A20944	HI #L-09-004
CO# AL-15020	PHIL# 461	PA#68-03387			NJ #CT004	CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
95	White	Yes	No	--	60% mineral wool 30% cellulose	ND	None
96	White	Yes	No	--	40% cellulose 40% mineral wool	ND	None
97	White	Yes	No	--	40% cellulose 40% mineral wool	ND	None
98	White	Yes	No	--	30% cellulose 60% mineral wool	ND	None
99	White	Yes	No	--	30% cellulose 60% mineral wool	ND	None
100	White	Yes	No	--	95% mineral wool	ND	None
101	White	Yes	No	--	95% mineral wool	ND	None
102	White	Yes	No	--	3% cellulose	ND	None
103	White	Yes	No	--	3% cellulose	ND	None
104	White	Yes	No	--	10% cellulose 80% mineral wool	ND	None
105	White	Yes	No	--	10% cellulose 80% mineral wool	ND	None
106	White	Yes	No	--	10% cellulose 80% mineral wool	ND	None
107	Grey	Yes	No	--	---	5%	Chrysotile
108	--	--	--	--	--	NA/PS	--
109	Dark Grey	Yes	No	--	---	5%	Chrysotile
110	--	--	--	--	--	NA/PS	--
111	Grey	Yes	No	--	---	5%	Chrysotile
112	--	--	--	--	--	NA/PS	--
113	Grey	Yes	No	--	---	3%	Chrysotile

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0
 RI #AAL-007 TX #300354
 CO# AL-15020

AIHA-LAP, LLC #100122 CT #PH-0426
 VT #AL014538 LA#05011 VA #3333 000283
 PHIL# 461 PA#68-03387

ME LA-0075, LB-0071 MA #AA000052
 AZ #A20944 HI #L-09-004

NY #10980 WV# LT000411
 NJ #CT004 CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
114	--	--	--	--	--	NA/PS	--
115	Dark Grey	Yes	No	--	---	5%	Chrysotile
116	--	--	--	--	--	NA/PS	--
117	Blue	Yes	No	--	---	ND	None
118♣	Blue	Yes	No	--	---	ND	None
119	Yellow	Yes	No	--	---	ND	None
120♣	Yellow	Yes	No	--	---	ND	None
121	Yellow	Yes	No	--	---	ND	None
122	Yellow	Yes	No	--	---	ND	None
123♣	Yellow	Yes	No	--	---	ND	None
124	Yellow-Cream	Yes	No	--	---	ND	None
125♣	Yellow-Cream	Yes	No	--	---	ND	None
126	Yellow	Yes	No	--	---	ND	None
127♣	Yellow	Yes	No	--	---	ND	None
128	Grey	Yes	No	--	---	ND	None
129♣	Grey	Yes	No	--	---	ND	None
130	Light Cream/Grey	Yes	No	--	---	ND	None
131♣	Light Cream/Grey	Yes	No	--	---	ND	None
132	Cream	Yes	No	--	---	ND	None
133♣	Cream	Yes	No	--	---	ND	None
134	Cream	Yes	No	--	---	ND	None
135♣	Cream	Yes	No	--	---	ND	None
136	Yellow	Yes	No	--	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP, LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
137♣	Yellow	Yes	No	--	---	ND	None
138	Tan	Yes	No	--	---	ND	None
139♣	Tan	Yes	No	--	---	ND	None
140	White	Yes	No	--	---	ND	None
141♣	White	Yes	No	--	---	2.1%	Chrysotile
142	Brown	Yes	No	--	---	10%	Chrysotile
143	--	--	--	--	--	NA/PS	--
144	--	--	--	--	--	NA/PS	--
145	--	--	--	--	--	NA/PS	--
146	Red	Yes	No	--	10% synthetic fiber	ND	None
147♣	Red	Yes	No	--	10% synthetic fiber	ND	None
148	Red	Yes	No	--	10% synthetic fiber	ND	None
149	Red	Yes	No	--	10% synthetic fiber	ND	None
150	Dark Red	Yes	No	--	5% synthetic fiber	ND	None
151♣	Dark Red	Yes	No	--	5% synthetic fiber	ND	None
152	Dark Red	Yes	No	--	5% synthetic fiber	ND	None
153	Brown	Yes	No	--	---	ND	None
154♣	Brown	Yes	No	--	---	ND	None
155	Light Red	Yes	No	--	10% synthetic fiber	ND	None
156♣	Light Red	Yes	No	--	10% synthetic fiber	ND	None
157	White (joint compound)	No	Yes	1	---	ND	None
157	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0
 RI #AAL-007 TX #300354
 CO# AL-15020

AIHA-LAP,LLC #100122 CT #PH-0426
 VT #AL0145.38 LA#05011 VA #3333 000283
 PHIL# 461 PA#68-03387

ME LA-0075, LB-0071 MA #AA000052
 AZ #A20944 HI #L-09-004

NY #10980 WV# LT000411
 NJ #CT004 CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
158	White (joint compound)	No	Yes	1	---	ND	None
158	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
159	White (joint compound)	No	Yes	1	---	ND	None
159	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
160	White (joint compound)	No	Yes	1	---	ND	None
160	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
161	White (joint compound)	No	Yes	1	---	ND	None
161	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
162	White (joint compound)	No	Yes	1	---	ND	None
162	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
163	White (joint compound)	No	Yes	1	---	ND	None
163	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
164	White (joint compound)	No	Yes	1	---	ND	None
164	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
165	White (joint compound)	No	Yes	1	---	ND	None
165	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
166	White (joint compound)	No	Yes	1	---	ND	None
166	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
167	White (joint compound)	No	Yes	1	---	ND	None
167	Light Grey (sheetrock)	No	Yes	2	3% cellulose	ND	None
168	Light Grey	Yes	No	--	3% cellulose	ND	None
169	Light Grey	Yes	No	--	3% cellulose	ND	None
170	White (skim coat)	No	Yes	1	---	ND	None
170	Light Grey (sheetrock)	No	Yes	2	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV#LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
171	White (skim coat)	No	Yes	1	---	ND	None
171	Light Grey (sheetrock)	No	Yes	2	---	ND	None
172	Light Grey	Yes	No	--	2% cellulose	ND	None
173	Light Grey	Yes	No	--	2% cellulose	ND	None
174	Tan (skim coat)	No	Yes	1	---	Trace	Chrysotile
174	Light Grey (sheetrock)	No	Yes	2	---	ND	None
175	Tan (skim coat)	No	Yes	1	---	Trace	Chrysotile
175	Light Grey (sheetrock)	No	Yes	2	---	ND	None
176	Black (mastic)	No	Yes	1	---	5%	Chrysotile
176	--	--	--	--	--	NA/PS	--
177	--	--	--	--	--	NA/PS	--
177	--	--	--	--	--	NA/PS	--
178	Yellow/Black (mastic)	No	Yes	1	---	3%	Chrysotile
178	--	--	--	--	--	NA/PS	--
179	--	--	--	--	--	NA/PS	--
179	--	--	--	--	--	NA/PS	--
180	Grey (glue)	No	Yes	1	---	ND	None
180	White (floor tile)	No	Yes	2	---	ND	None
181♣	Grey (glue)	No	Yes	1	---	ND	None
181♣	White (floor tile)	No	Yes	2	---	ND	None
182	Yellow (glue)	No	Yes	1	---	ND	None
182	Tan (floor tile)	No	Yes	2	---	ND	None
183♣	Yellow (glue)	No	Yes	1	---	ND	None
183♣	Tan (floor tile)	No	Yes	2	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV#LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
184	Black (mastic)	No	Yes	1	---	3%	Chrysotile
184	--	--	--	--	--	NA/PS	--
185	--	--	--	--	--	NA/PS	--
185	--	--	--	--	--	NA/PS	--
186	Tan/Black (mastic)	No	Yes	1	---	5%	Chrysotile
186	--	--	--	--	--	NA/PS	--
187	--	--	--	--	--	NA/PS	--
187	--	--	--	--	--	NA/PS	--
188	Yellow (mastic)	No	Yes	1	---	ND	None
188	Light Beige (floor tile)	No	Yes	2	---	ND	None
189♣	Yellow (mastic)	No	Yes	1	---	ND	None
189♣	Light Beige (floor tile)	No	Yes	2	---	ND	None
190	Yellow (mastic)	No	Yes	1	---	ND	None
190	Light Beige (floor tile)	No	Yes	2	---	ND	None
191	Yellow (mastic)	No	Yes	1	---	ND	None
191	Light Beige (floor tile)	No	Yes	2	---	ND	None
192♣	Yellow (mastic)	No	Yes	1	---	ND	None
192♣	Light Beige (floor tile)	No	Yes	2	---	ND	None
193	Yellow (mastic)	No	Yes	1	---	ND	None
193	Light Beige (floor tile)	No	Yes	2	---	ND	None
194	Amber (glue)	No	Yes	1	---	3%	Chrysotile
194	--	--	--	--	--	NA/PS	--
195	--	--	--	--	--	NA/PS	--
195	--	--	--	--	--	NA/PS	--

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0
 RI #AAL-007 TX #300354
 CO# AL-15020

AIHA-LAP,LLC #100122 CT #PH-0426
 VT #AL014538 LA#05011 VA #3333 000283
 PHIL# 461 PA#68-03387

ME LA-0075, LB-0071 MA #AA000052
 AZ #A20944 HI #L-09-004

NY #10980 WV# LT000411
 NJ #CT004 CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
196	Yellow (glue)	No	Yes	1	---	ND	None
196	Yellow (floor tile)	No	Yes	2	---	ND	None
197♣	Yellow	Yes	No	--	---	ND	None
198	Dark Grey	Yes	No	--	---	ND	None
199♣	Yellow (glue)	No	Yes	1	---	ND	None
199♣	Dark Grey (floor tile)	No	Yes	2	---	ND	None
200	Black (mastic)	No	Yes	1	---	5%	Chrysotile
200	--	--	--	--	--	NA/PS	--
201	--	--	--	--	--	NA/PS	--
201	--	--	--	--	--	NA/PS	--
202	Yellow (glue)	No	Yes	1	---	ND	None
202	Tan/Maroon (floor tile)	No	Yes	2	---	ND	None
203♣	Yellow (glue)	No	Yes	1	---	ND	None
203♣	Tan/Maroon (floor tile)	No	Yes	2	---	ND	None
204	Black (mastic)	No	Yes	1	---	5%	Chrysotile
204	--	--	--	--	--	NA/PS	--
205	--	--	--	--	--	NA/PS	--
205	--	--	--	--	--	NA/PS	--
206	Black (mastic)	No	Yes	1	---	5%	Chrysotile
206	--	--	--	--	--	NA/PS	--
207	--	--	--	--	--	NA/PS	--
207	--	--	--	--	--	NA/PS	--
208	Black (mastic)	No	Yes	1	---	5%	Chrysotile
208	--	--	--	--	--	NA/PS	--

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
209	--	--	--	--	--	NA/PS	--
209	--	--	--	--	--	NA/PS	--
210	Yellow (glue)	No	Yes	1	---	ND	None
210	Dark Grey/White/Pink/Blue (floor tile)	No	Yes	2	---	ND	None
211♣	Yellow (glue)	No	Yes	1	---	ND	None
211♣	Dark Grey/White/Pink/Blue (floor tile)	No	Yes	2	---	ND	None
212	Black (mastic)	No	Yes	1	---	5%	Chrysotile
212	--	--	--	--	--	NA/PS	--
213	--	--	--	--	--	NA/PS	--
213	--	--	--	--	--	NA/PS	--
214	Black (mastic)	No	Yes	1	---	5%	Chrysotile
214	--	--	--	--	--	NA/PS	--
215	--	--	--	--	--	NA/PS	--
215	--	--	--	--	--	NA/PS	--
216	Teal	Yes	No	--	---	ND	None
217♣	Yellow (glue)	No	Yes	1	---	ND	None
217♣	Teal (floor tile)	No	Yes	2	---	ND	None
218	Yellow (glue)	No	Yes	1	---	ND	None
218	Dark Cream (floor tile)	No	Yes	2	---	ND	None
219♣	Dark Cream	Yes	No	--	---	ND	None
220	Black (mastic)	No	Yes	1	---	5%	Chrysotile
220	--	--	--	--	--	NA/PS	--
221	--	--	--	--	--	NA/PS	--
221	--	--	--	--	--	NA/PS	--

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-1S020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
222	Yellow (glue)	No	Yes	1	---	ND	None
222	White/Pink/Blue (floor tile)	No	Yes	2	---	ND	None
223♣	Yellow (glue)	No	Yes	1	---	ND	None
223♣	White/Pink/Blue (floor tile)	No	Yes	2	---	ND	None
224	Pink	Yes	No	--	---	ND	None
225♣	Yellow (glue)	No	Yes	1	---	ND	None
225♣	Pink (floor tile)	No	Yes	2	---	ND	None
226	Yellow (glue)	No	Yes	1	---	ND	None
226	White/Light Grey (floor tile)	No	Yes	2	---	ND	None
227♣	White/Light Grey	Yes	No	--	---	ND	None
228	Black	Yes	No	--	---	ND	None
229♣	Yellow (glue)	No	Yes	1	---	ND	None
229♣	Black (floor tile)	No	Yes	2	---	ND	None
230	Yellow (glue)	No	Yes	1	---	ND	None
230	White/Black (floor tile)	No	Yes	2	---	ND	None
231♣	White/Black	Yes	No	--	---	ND	None
232	Black (mastic)	No	Yes	1	---	5%	Chrysotile
232	--	--	--	--	--	NA/PS	--
233	--	--	--	--	--	NA/PS	--
233	--	--	--	--	--	NA/PS	--
234	Black/White	Yes	No	--	---	ND	None
235♣	Yellow (glue)	No	Yes	1	---	ND	None
235♣	Black/White (floor tile)	No	Yes	2	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIIA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV#LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387



POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
236	Yellow (glue)	No	Yes	1	---	ND	None
236	White (floor tile)	No	Yes	2	---	ND	None
237♣	White	Yes	No	--	---	ND	None
238	Grey (glue)	No	Yes	1	---	ND	None
238	Cream/Grey (floor tile)	No	Yes	2	---	ND	None
239♣	Grey (glue)	No	Yes	1	---	ND	None
239♣	Cream/Grey (floor tile)	No	Yes	2	---	ND	None
240	Black (mastic)	No	Yes	1	---	5%	Chrysotile
240	--	--	--	--	--	NA/PS	--
241	--	--	--	--	--	NA/PS	--
241	--	--	--	--	--	NA/PS	--
242	Black (mastic)	No	Yes	1	---	3%	Chrysotile
242	--	--	--	--	--	NA/PS	--
243	--	--	--	--	--	NA/PS	--
243	--	--	--	--	--	NA/PS	--
244	White (skim coat)	No	Yes	1	---	ND	None
244	Tan (base coat)	No	Yes	2	---	ND	None
245	White (skim coat)	No	Yes	1	---	ND	None
245	Tan (base coat)	No	Yes	2	---	ND	None
246	White (skim coat)	No	Yes	1	---	ND	None
246	Tan (base coat)	No	Yes	2	---	ND	None
247	White (skim coat)	No	Yes	1	---	ND	None
247	Tan (base coat)	No	Yes	2	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
248	White (skim coat)	No	Yes	1	---	ND	None
248	Tan (base coat)	No	Yes	2	---	ND	None
249	White (skim coat)	No	Yes	1	---	ND	None
249	Tan (base coat)	No	Yes	2	---	ND	None
250	White (skim coat)	No	Yes	1	---	ND	None
250	Tan (base coat)	No	Yes	2	---	ND	None
251	White (skim coat)	No	Yes	1	---	ND	None
251	Tan (base coat)	No	Yes	2	---	ND	None
252	White (skim coat)	No	Yes	1	---	ND	None
252	Tan (base coat)	No	Yes	2	---	ND	None
253	White (skim coat)	No	Yes	1	---	ND	None
253	Tan (base coat)	No	Yes	2	---	ND	None
254	White (skim coat)	No	Yes	1	---	ND	None
254	Tan (base coat)	No	Yes	2	---	ND	None
255	White (skim coat)	No	Yes	1	---	ND	None
255	Tan (base coat)	No	Yes	2	---	ND	None
256	White (skim coat)	No	Yes	1	---	ND	None
256	Tan (base coat)	No	Yes	2	---	ND	None
257	White (skim coat)	No	Yes	1	---	ND	None
257	Tan (base coat)	No	Yes	2	---	ND	None
258	White (skim coat)	No	Yes	1	---	ND	None
258	Tan (base coat)	No	Yes	2	---	ND	None
259	White (skim coat)	No	Yes	1	---	ND	None
259	Tan (base coat)	No	Yes	2	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP, LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV#LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
260	White (skim coat)	No	Yes	1	---	ND	None
260	Tan (base coat)	No	Yes	2	---	ND	None
261	White (skim coat)	No	Yes	1	---	ND	None
261	Tan (base coat)	No	Yes	2	---	ND	None
262	White (skim coat)	No	Yes	1	---	ND	None
262	Tan (base coat)	No	Yes	2	---	ND	None
263	White (skim coat)	No	Yes	1	---	ND	None
263	Tan (base coat)	No	Yes	2	---	ND	None
264	White (skim coat)	No	Yes	1	---	ND	None
264	Tan (base coat)	No	Yes	2	---	ND	None
265	White (skim coat)	No	Yes	1	---	ND	None
265	Tan (base coat)	No	Yes	2	---	ND	None
266	White (skim coat)	No	Yes	1	---	ND	None
266	Tan (base coat)	No	Yes	2	---	ND	None
267	White (skim coat)	No	Yes	1	---	ND	None
267	Tan (base coat)	No	Yes	2	---	ND	None
268	White (skim coat)	No	Yes	1	---	ND	None
268	Tan (base coat)	No	Yes	2	---	ND	None
269	White (skim coat)	No	Yes	1	---	ND	None
269	Tan (base coat)	No	Yes	2	---	ND	None
270	White (skim coat)	No	Yes	1	---	ND	None
270	Tan (base coat)	No	Yes	2	---	ND	None
271	White (skim coat)	No	Yes	1	---	ND	None
271	Tan (base coat)	No	Yes	2	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
272	White (skim coat)	No	Yes	1	---	ND	None
272	Tan (base coat)	No	Yes	2	---	ND	None
273	White (skim coat)	No	Yes	1	---	ND	None
273	Tan (base coat)	No	Yes	2	---	ND	None
274	Blue	Yes	No	--	---	ND	None
275♣	Blue	Yes	No	--	---	ND	None
276	Black	Yes	No	--	---	5%	Chrysotile
277	--	--	--	--	--	NA/PS	--
278	Black	Yes	No	--	---	5%	Chrysotile
279	--	--	--	--	--	NA/PS	--
280	Black	Yes	No	--	---	5%	Chrysotile
281	--	--	--	--	--	NA/PS	--
282	Brown	Yes	No	--	---	ND	None
283♣	Brown	Yes	No	--	---	ND	None
284	Brown	Yes	No	--	---	20%	Chrysotile
285	--	--	--	--	--	NA/PS	--
286	Light Grey	Yes	No	--	---	ND	None
287♣	Light Grey	Yes	No	--	---	ND	None
288	Light Purple	Yes	No	--	---	20%	Chrysotile
289	--	--	--	--	--	NA/PS	--
290	Brown	Yes	No	--	---	ND	None
291♣	Brown	Yes	No	--	---	ND	None
292	Tan	Yes	No	--	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVI,AP Lab Code 101424-0
 RI #AAL-007 TX #300354
 CO# AL-15020

AIHA-LAP,LLC #100122 CT #PH-0426
 VT #AL014538 LA#05011 VA #3333 000283
 PHIL# 461 PA#68-03387

ME LA-0075, LB-0071 MA #AA000052
 AZ #A20944 HI #L-09-004

NY #10980 WV# LT000411
 NJ #CT004 CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
293♣	Tan	Yes	No	--	---	ND	None
294	Black	Yes	No	--	90% cellulose	ND	None
295	Black	Yes	No	--	90% cellulose	ND	None
296	Yellow (glue)	No	Yes	1	---	ND	None
296	Silver/Brown (foil paper)	No	Yes	2	80% cellulose	ND	None
297♣	Yellow (glue)	No	Yes	1	---	ND	None
297	Silver/Brown (foil paper)	No	Yes	2	80% cellulose	ND	None
298	Grey	Yes	No	--	---	80%	Chrysotile
299	Light Grey	Yes	No	--	60% mineral wool	ND	None
300	Grey (glue)	No	Yes	1	---	ND	None
300	Brown/Silver (paper)	No	Yes	2	90% cellulose	ND	None
301♣	Grey (glue)	No	Yes	1	---	ND	None
301	Brown/Silver (paper)	No	Yes	2	90% cellulose	ND	None
302	Yellow (glue)	No	Yes	1	---	ND	None
302	Brown/Silver (paper)	No	Yes	2	90% cellulose	ND	None
303♣	Yellow (glue)	No	Yes	1	---	ND	None
303	Brown/Silver (paper)	No	Yes	2	90% cellulose	ND	None
304	White	Yes	No	--	5% cellulose	ND	None
305	White	Yes	No	--	5% cellulose	ND	None
306	White	Yes	No	--	5% cellulose	ND	None
307	White	Yes	No	--	5% cellulose	ND	None
308	White	Yes	No	--	60% cellulose	ND	None
309	Light Grey	Yes	No	--	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP, LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
310♣	Light Grey	Yes	No	--	---	ND	None
311	Light Grey	Yes	No	--	---	ND	None
312	Black	Yes	No	--	5% cellulose	ND	None
313♣	Black	Yes	No	--	---	ND	None
314	White	Yes	No	--	90% cellulose	ND	None
315♣	White	Yes	No	--	---	ND	None
316	White	Yes	No	--	---	ND	None
317	Grey	Yes	No	--	---	ND	None
318♣	Grey	Yes	No	--	---	ND	None
319	Grey	Yes	No	--	10% synthetic fiber	ND	None
320♣	Grey	Yes	No	--	10% synthetic fiber	ND	None
321	Tan	Yes	No	--	---	ND	None
322	Tan	Yes	No	--	---	ND	None
323	Cream	Yes	No	--	---	ND	None
324	Cream	Yes	No	--	---	ND	None
325	Dark Grey	Yes	No	--	---	ND	None
326	Dark Grey	Yes	No	--	---	ND	None
327	White	Yes	No	--	---	ND	None
328	White	Yes	No	--	---	ND	None
329	Dark Grey	Yes	No	--	---	ND	None
330	Dark Grey	Yes	No	--	---	ND	None
331	White	Yes	No	--	---	ND	None
332	White	Yes	No	--	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0	AIHA-LAP,LLC #100122	CT #PH-0426	ME LA-0075, LB-0071	MA #AA000052	NY #10980	WV#LT000411
RI #AAL-007	TX #300354	VT #AL014538	LA#05011	VA #3333 000283	AZ #A20944	HI #L-09-004
CO# AL-15020	PHIL# 461	PA#68-03387			NJ #CT004	CA #2907

POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
333	Yellow	Yes	No	--	---	5%	Chrysotile
334	--	--	--	--	--	NA/PS	--
335	White	Yes	No	--	---	ND	None
336♣	White	Yes	No	--	---	ND	None
337	White	Yes	No	--	---	ND	None
338	Light Grey	Yes	No	--	---	ND	None
339♣	Light Grey	Yes	No	--	---	ND	None
340	Grey	Yes	No	--	---	ND	None
341♣	Grey	Yes	No	--	---	ND	None
342	Tan	Yes	No	--	---	Trace	Chrysotile
343♣	Tan	Yes	No	--	---	3.7%	Chrysotile
344	Grey	Yes	No	--	---	ND	None
345♣	Grey	Yes	No	--	---	1.7%	Chrysotile
346	Tan	Yes	No	--	---	ND	None
347♣	Tan	Yes	No	--	---	ND	None
348	Grey	Yes	No	--	---	ND	None
349♣	Grey	Yes	No	--	---	ND	None
350	Grey	Yes	No	--	---	Trace	Chrysotile
351♣	Grey	Yes	No	--	---	1.6%	Chrysotile
352	Light Grey	Yes	No	--	40% cellulose	40%	Chrysotile
353	White	Yes	No	--	---	20%	Amosite
354	Grey	Yes	No	--	---	40%	Chrysotile
355	Light Grey	Yes	No	--	60% mineral wool	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0	AIHA-LAP,LLC #100122	CT #PH-0426	ME LA-0075, LB-0071	MA #AA000052	NY #10980	WV# LT000411
RI #AAL-007	TX #300354	VT #AL014538	LA#05011	VA #3333 000283	AZ #A20944	HI #L-09-004
CO# AL-15020	PHIL# 461	PA#68-03387			NJ #CT004	CA #2907



POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
356	Light Grey	Yes	No	--	60% mineral wool	Tracc	Chrysotile
357	Light Grey	Yes	No	--	50% mineral wool	ND	None
358	Light Grey	Yes	No	--	50% mineral wool	ND	None
359	Light Grey	Yes	No	--	50% mineral wool	ND	None
360	Light Grey	Yes	No	--	50% mineral wool	ND	None
361	Light Grey	Yes	No	--	50% mineral wool	ND	None
362	Light Grey	Yes	No	--	50% mineral wool	ND	None
363	Light Grey	Yes	No	--	50% mineral wool	ND	None
364	Light Grey	Yes	No	--	50% mineral wool	ND	None
365	Light Grey	Yes	No	--	50% mineral wool	ND	None
366	Black	Yes	No	--	30% cellulose	ND	None
367♣	Black	Yes	No	--	---	ND	None
368	Dark Brown	Yes	No	--	---	ND	None
369♣	Dark Brown	Yes	No	--	---	ND	None
370	Dark Brown	Yes	No	--	---	ND	None
371	Dark Brown	Yes	No	--	---	ND	None
372	Cream	Yes	No	--	---	ND	None
373♣	Cream	Yes	No	--	---	ND	None
374	Tan	Yes	No	--	---	ND	None
375♣	Tan	Yes	No	--	---	ND	None
376	Grey	Yes	No	--	---	ND	None
377♣	Grey	Yes	No	--	---	ND	None
378	Cream	Yes	No	--	---	ND	None

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387



POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi-Layered	Layer No.	Other Matrix Materials	Asbestos %	Asbestos Type
379♣	Cream	Yes	No	--	---	ND	None
380	Yellow	Yes	No	--	---	ND	None
381♣	Yellow	Yes	No	--	---	ND	None

♣Samples analyzed by EPA/600/R-93/116 with gravimetric reduction

Reporting limit- asbestos present at 1%

ND - asbestos was not detected

Trace - asbestos was observed at level of less than 1%

NA/PS - Not Analyzed / Positive Stop

SNA- Sample Not Analyzed- See Chain of Custody for details

Note: Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. In those cases, EPA recommends, and certain states (e.g. NY) require, that negative results be confirmed by quantitative transmission electron microscopy.

The Laboratory at TRC follows the EPA's Interim Method for the Determination of Asbestos in Bulk Insulation (1982), and the EPA recommended Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116), July 1993, R.L. Perkins and B.W. Harvey which utilizes polarized light microscopy (PLM). Our analysts have completed an accredited course in asbestos identification. TRC's Laboratory is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), for Bulk Asbestos Fiber Analysis, NVLAP Code 13/A01, effective through June 30, 2016. TRC is an American Industrial Hygiene Association (AIHA) accredited lab for PLM effective through October 1, 2016. Asbestos content is determined by visual estimate unless otherwise indicated. Quality Control is performed in-house on at least 10% of samples and the QC data related to the samples is available upon written request from the client.

This report shall not be reproduced, except in full, without the written approval of TRC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report relates only to the items tested.

Analyzed by: *Amanda Parkins* Reviewed by: *Kathleen Williamson* Date Issued
 Amanda Parkins, Laboratory Analyst Kathleen Williamson, Laboratory Manager 01/20/2016

TRC LABORATORY ASBESTOS ANALYTICAL ACCREDITATIONS

NVLAP Lab Code 101424-0 AIHA-LAP,LLC #100122 CT #PH-0426 ME LA-0075, LB-0071 MA #AA000052 NY #10980 WV# LT000411
 RI #AAL-007 TX #300354 VT #AL014538 LA#05011 VA #3333 000283 AZ #A20944 HI #L-09-004 NJ #CT004 CA #2907
 CO# AL-15020 PHIL# 461 PA#68-03387

APPENDIX M

**ASBESTOS BULK SAMPLE CHAIN OF CUSTODY
FORMS**



21 GRIFFIN ROAD NORTH
WINDSOR, CONNECTICUT 06095
TELEPHONE (860) 298-9692
FAX (860) 298-6380

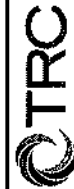
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersede Previous Edition

LAB ID #. 47320

PROJECT NUMBER		PROJECT NAME		PARAMETERS					TURNAROUND TIME							
									PLM:	24hr	48hr	X	3day	5day		
244600.0001.0000		DCS-Bridgeport Mental Health Center, Bridgeport, CT		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (W/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (P > 1% & Δ10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	TEM:	24hr	48hr	3day	5day			
SIGNATURE				INSPECTOR				MATERIAL								
				Gregory Kaczynski												
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (W/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (P > 1% & Δ10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	24hr	48hr	3day	5day	
				COMP	GRAB											
25	10/7/15	1416	X	4 th floor - PC3		X										
26	10/15/15	0950	X	5 th floor - PC3		X										
27	10/15/15	0950	X	5 th floor - PC3		X										
28	10/15/15	0950	X	5 th floor - PC3		X										
29	10/7/15	1500	X	5 th floor - PC2		X										
30	10/7/15	1502	X	5 th floor - PC2		X										
31	10/15/15	1036	X	Room 652		X										
32	10/15/15	1035	X	Room 652		X										

Relinquished by: (Signature) 	Date:	12/8/2015	Received by: (Signature)	12/8/15	
	(Printed) Gregory Kaczynski	Time:	0930	(Printed) Amanda Parkins	Time:
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
		Comments:			



21 GRIFFIN ROAD NORTH
 WINDSOR, CONNECTICUT 06095
 TELEPHONE (860) 298-9692
 FAX (860) 298-6380

ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
 Supersede Previous Edition

LAB ID #. **47320**

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME									
						PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	MATERIAL										
								8hr	24hr	48hr	3day	5day					
41	10/16/15	1259	X	X	X	Room 861	Roof drain fitting										
42	9/24/15	1320	X	X	X	3 rd floor mech room	MF3 - cloth wrapped on 7" OD fg line										
43	9/24/15	1115	X	X	X	5 th floor mech room	MF3 - cloth wrapped on 7" OD fg line										
44	9/24/15	1019	X	X	X	7 th floor mech room	MF3 - cloth wrapped on 7" OD fg line										
45	9/24/15	0933	X	X	X	8 th floor mech room	MF3 - cloth wrapped on 7" OD fg line										
46	9/24/15	1434	X	X	X	Ground floor mech room	MF4 - cloth wrapped on 2" or 3" OD fg line										
47	9/24/15	1425	X	X	X	Ground floor mech room	MF4 - cloth wrapped on 2" or 3" OD fg line										
48	9/25/15	0951	X	X	X	Room 32	MF4 - cloth wrapped on 2" or 3" OD fg line										
49	9/25/15	1436	X	X	X	Room 152	MF4 - cloth wrapped on 2" or 3" OD fg line										
50	9/24/15	1010	X	X	X	7 th floor mech room	MF4 - cloth wrapped on 2" or 3" OD fg line										
51	9/24/15	1111	X	X	X	5 th floor mech room	MF4 - cloth wrapped on 2" or 3" OD fg line										

Relinquished by: (Signature) 	Date:	12/8/2015	Received by: (Signature) 	Date:	12/8/15	Relinquished by: (Signature)	Received by: (Signature)
	(Printed) Gregory Kaczynski	Time:	0930	(Printed) Amanda Parkins	Time:	1000	(Printed)
Remarks:							
Condition of Samples: <input checked="" type="checkbox"/> Acceptable: Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:							



21 GRIFFIN ROAD NORTH
WINDSOR, CONNECTICUT 06095
TELEPHONE (860) 298-9692
FAX (860) 298-6380

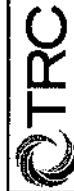
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersede Previous Edition

LAB ID #. 47320

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME								
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (W/gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT	X	X											
SIGNATURE 		INSPECTOR Gregory Kaczynski		MATERIAL										
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	MATERIAL							
52	9/25/15	0855	X			Room 49	MF5 - 6" OD MF on uninsulated line							
53	9/24/15	1350	X			2 nd floor mech room	MF5 - 6" OD MF on uninsulated line							
54	9/24/15	1430	X			Ground floor mech room	MF6 - 4"+6" OD fg lines with cloth covered MFs							
55	9/24/15	1432	X			Ground floor mech room	MF6 - 4"+6" OD fg lines with cloth covered MFs							
56	9/24/15	1434	X			Ground floor mech room	MF6 - 4"+6" OD fg lines with cloth covered MFs							
57	9/24/15	1436	X			Ground floor mech room	MF6 - 4"+6" OD fg lines with cloth covered MFs							
58	9/28/15	1433	X			Room 152	MF6 - 4"+6" OD fg lines with cloth covered MFs							
59	10/7/15	0946	X			Entry 337	MF7-white uncovered mudded fitting on 6" OD fg line							
60	11/4/15	1307	X			3 rd floor connector	MF7-white uncovered mudded fitting on 6" OD fg line							
61	9/21/15	1455	X			Corridor 2	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have venis)							

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(Printed) Gregory Kaczynski	Time:	0930	(Printed) Amanda Parkins	1000	(Printed)	Time:	(Printed)
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Comments:		Page 7 of 41	



ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

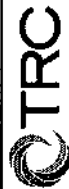
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Edition: October 2009
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LAB ID #. 47320

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS				TURNAROUND TIME									
						PLM EPA 600/R93/16 (POSITIVE STOP)	PLM EPA 600/R93/16 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (P > 1% & < 10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	8hr	24hr	48hr	3day	5day			
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMF	GRAB	SAMPLE LOCATION	MATERIAL												
							CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)	CT1A - 1x1 white spline w/long squiggles ceiling tile (some have vents)			
62	9/25/15	1113	X	X	X	Corridor 102	X				X								
63	10/2/15	1030	X	X	X	Room 202	X				X								
64	10/7/15	0940	X	X	X	Lobby 301	X				X								
65	10/2/15	1151	X	X	X	Room 328B	X				X								
66	10/15/15	1041	X	X	X	Room 655	X				X								
67	11/4/15	1015	X	X	X	Room 825	X				X								
68	9/25/15	0920	X	X	X	Room 39	X				X								
69	9/25/15	1534	X	X	X	Corridor 144	X				X								

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Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Page 8 of 41	



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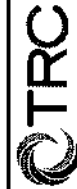
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersede Previous Edition

LAB ID #. 47320

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME									
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day		
244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT														
SIGNATURE 		INSPECTOR Gregory Kaczynski		MATERIAL											
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION									
70	9/28/15	0906	X		X	Corridor 114	X								CT2A - 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
71	9/28/15	1111	X		X	Room 124	X								CT2A - 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
72	9/28/15	1335	X		X	Room 206	X								CT2A - 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
73	10/7/15	0943	X		X	Corridor 332	X								CT2A - 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
74	10/7/15	1043	X		X	Reception 403	X								CT2A - 2x4 white long squiggly w/ pinholes and red back ceiling tile (some have vents)
75	9/21/15	1111	X		X	Corridor 6	X								CT3A - 2x2 comma, pinhole ceiling tile
76	9/25/15	1118	X		X	Room 126A	X								CT3A - 2x2 comma, pinhole ceiling tile
77	9/28/15	1531	X		X	Room 228	X								CT3A - 2x2 comma, pinhole ceiling tile
78	10/15/15	1128	X		X	Rec 618	X								CT3A - 2x2 comma, pinhole ceiling tile

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	(Printed) Gregory Kaczynski	Time:	0930	(Printed) Amanda Parkins	Time:	1000	(Printed)	
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Comments:		Page 9 of 41		



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersede Previous Edition

LAB ID #. 47320

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME										
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & >10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day			
244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT	X	X		X							X				
SIGNATURE		INSPECTOR		MATERIAL												
		Gregory Kaczynski														
FIELD SAMPLE NUMBER	DATE	TIME	TYPE		SAMPLE LOCATION	MATERIAL	CT3A - 2x2 comma, pinhole ceiling tile	CT1-2x2 long squiggly/pinhole/dot w/ vent, red back ceiling tiles	CT1-2x2 long squiggly/pinhole/dot w/ vent, red back ceiling tiles	CT2 - 2x2 wormhole/pinhole ceiling tile (some have vents)	CT2 - 2x2 wormhole/pinhole ceiling tile (some have vents)	CT3 - 2x4 comma pinhole ceiling tile	CT3 - 2x4 comma pinhole ceiling tile	CT3 - 2x4 comma pinhole ceiling tile	CT3 - 2x4 comma pinhole ceiling tile	CT5 - 2x4 busy wormhole/pinhole
			COMP	GRAB												
79	10/16/15	0921	X	X	Room 718											
80	9/25/15	0940	X	X	Room 35											
81	10/7/15	1150	X	X	Room 427											
82	9/25/15	1549	X	X	Room 25											
83	10/2/15	1115	X	X	3 rd floor - cafeteria											
84	9/25/15	0850	X	X	Room 41											
85	9/25/15	1520	X	X	Room 120											
86	10/7/15	1525	X	X	Room 512											
87	11/4/15	0947	X	X	Room 826											
88	9/25/15	1200	X	X	Room 106A											

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Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Page 10 of 41	



ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

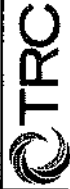
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Edition: October 2009
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LAB ID #. **47320**

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME					
						PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & >10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	8hr	24hr
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	MATERIAL	24hr	48hr	3day	5day		
								24hr	48hr	3day	5day	PLM:	TEM:
89	9/25/15	1200	X		X	Room 106A	CT5 - 2x4 busy wormhole/pinhole					X	
90	9/25/15	1325	X		X	Corridor 163	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
91	9/28/15	1312	X		X	Room 209	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
92	10/2/15	1445	X		X	Corridor 316	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
93	10/7/15	0950	X		X	Entry 337	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
94	10/7/15	1320	X		X	Room 430	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
95	10/15/15	1019	X		X	Room 612	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
96	9/28/15	0947	X		X	Room 137	CT2A - 2x2 white long squiggly w/ pinholes and red back ceiling tile (some have vents)					X	
97	9/28/15	0947	X		X	Room 137	CT7-2x4 wormhole pinhole ceiling tile					X	

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Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID # W7320

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME								
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (# > 1% & < 10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT													
SIGNATURE		INSPECTOR		SAMPLE LOCATION		MATERIAL								
		Gregory Kaczynski												
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB									
98	10/2/15	1033	X		X	Room 202	X							CT8-1x1 splined wormhole/divot ceiling tile (replacement)
99	10/2/15	1149	X		X	Room 328B	X							CT8-1x1 splined wormhole/divot ceiling tile (replacement)
100	10/2/15	1055	X		X	3 rd floor - cafeteria	X							CT9 - 1x1 white spline w/long squiggles ceiling tile (no red back)
101	10/2/15	1055	X		X	3 rd floor - cafeteria	X							CT9 - 1x1 white spline w/long squiggles ceiling tile (no red back)
102	10/2/15	1353	X		X	Kitchen 318	X							CT10-2x2 sheetrock ceiling tile
103	10/2/15	1347	X		X	Serving 319	X							CT10-2x2 sheetrock ceiling tile
104	10/16/15	1318	X		X	Corridor 586	X							CT11-2x2 mountainous texture multisize pinhole ceiling tile
105	10/15/15	1441	X		X	Corridor outside room 746	X							CT11-2x2 mountainous texture multisize pinhole ceiling tile

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(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	Time: 1000
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Comments:	
		Page 12 of 41	



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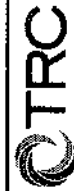
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
 Supersede Previous Edition

LAB ID #: 47320

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME												
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (R > 1% & < 10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day					
244600-0001-0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT																	
SIGNATURE		INSPECTOR		MATERIAL														
		Gregory Kaczynski																
FIELD SAMPLE NUMBER	DATE	TIME	TYPE		SAMPLE LOCATION	PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (R > 1% & < 10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
			COMP	GRAB														
115	11/4/15	1351	X	X	Room 409	X												
116	11/4/15	1404	X	X	Room 609		X											
117	9/21/15	1150	X	X	Room 8	X												
118	9/21/15	1150	X	X	Room 8		X											
119	9/25/15	1323	X	X	Room 162	X												
120	9/25/15	1111	X	X	Corridor 102		X											
121	10/15/15	1020	X	X	Room 612	X												
122	9/25/15	1334	X	X	Corridor 163	X												
123	9/25/15	1334	X	X	Corridor 163		X											
124	9/21/15	1047	X	X	Room 4	X												

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Gregory Kaczynski	Time:	0930	Amanda Parkins	Time:	1000				
Remarks:	Condition of Samples: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No								
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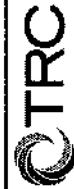
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. **47320**

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME							
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & >10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day
244600-0001-0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT												
SIGNATURE		INSPECTOR		MATERIAL									
		Gregory Kaczynski											
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COM	GRA	SAMPLE LOCATION							
125	9/21/15	1049	X			Room 4	X						G1-residual yellow creamish carpet glue
126	9/24/15	1359	X			2 nd floor mech room	X						G2-yellow glue under fiberglass associated w/DW1 (between fg/metal)
127	9/24/15	1144	X			4 th floor mech room	X						G2-yellow glue under fiberglass associated w/DW1 (between fg/metal)
128	9/25/15	1400	X			Room 159	X						G3-grey glue behind Styrofoam insulation behind electric base heater
129	9/25/15	1400	X			Room 159	X						G3-grey glue behind Styrofoam insulation behind electric base heater
130	9/28/15	0940	X			Room 142	X						G4-light cream/grey glue under foil fiberglass duct insulation
131	9/28/15	0940	X			Room 142	X						G4-light cream/grey glue under foil fiberglass duct insulation
132	10/2/15	1340	X			Serving 319	X						G5-cream glue behind 4"x4" ceramic wall tile
133	10/2/15	1341	X			Serving 319	X						G5-cream glue behind 4"x4" ceramic wall tile

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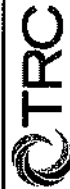
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID # 47320

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME										
						PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMB	GRAB	SAMPLE LOCATION	MATERIAL											
								PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	8hr	24hr	48hr	3day	5day	
144	10/7/15	1336	X		X	4 th floor - PC2	FS1-brown putty fire stop	X										
145	9/24/15	1015	X		X	7 th floor mech room	FS1-brown putty fire stop	X										
146	9/24/15	1356	X		X	2 nd floor mech room	FS2-red flexible fire stop	X										
147	10/27/15	1100	X		X	Room 409	FS2-red flexible fire stop	X										
148	10/15/15	1309	X		X	Corridor outside room 641	FS2-red flexible fire stop	X										
149	9/24/15	0906	X		X	8 th floor mech room	FS2-red flexible fire stop	X										
150	9/28/15	1523	X		X	Room 225	FS3-crumbly, brick colored firestop	X										
151	9/24/15	1107	X		X	5 th floor mech room	FS3-crumbly, brick colored firestop	X										
152	9/24/15	0915	X		X	8 th floor mech room	FS3-crumbly, brick colored firestop	X										
153	9/25/15	1459	X		X	Room 70	FS5-brown flexible firestop	X										
154	9/28/15	1313	X		X	Room 209	FS5-brown flexible firestop	X										

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	(Printed) Gregory Kaczynski	Time:	0930	(Printed) Amanda Parkins	Time:
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
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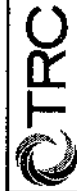
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. **47320**

PROJECT NUMBER	PROJECT NAME		INSPECTOR		PARAMETERS		TURNAROUND TIME											
	244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT		Gregory Kaczynski		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAF	SAMPLE LOCATION												
155	10/16/15	1442	X			Room 802	X											
156	10/16/15	1442	X			Room 802		X										
157	9/21/15	1412	X			Room 20	X		X									
158	9/28/15	0937	X			Room 142	X		X									
159	9/25/15	1117	X			Room 126A	X		X									
160	10/2/15	1107	X			3 rd floor - cafeteria column	X		X									
161	10/2/15	1110	X			3 rd floor - cafeteria beam	X		X									
162	10/27/15	1058	X			Room 409	X		X									
163	10/15/15	1140	X			Rec 618	X		X									
164	10/15/15	1310	X			Corridor outside room 641	X		X									
165	10/16/15	0930	X			Corridor outside room 731	X		X									

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Date: 12/8/15	Relinquished by: (Signature)	Received by: (Signature)
(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	Time: 1000	(Printed)	(Printed)
Remarks:				Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
				Page 18 of 41	



21 GRIFFIN ROAD NORTH
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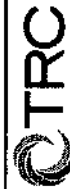
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersede Previous Edition

LAB ID #. **47320**

PROJECT NUMBER	PROJECT NAME		INSPECTOR	PARAMETERS				TURNAROUND TIME											
	244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT		Gregory Kaczynski	PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%) (IF PLM SERIES NEG)	TEM NY NOB 198.4	PLM:	TEM:	8hr	24hr	48hr	3day	48hr	3day	5day	
SIGNATURE	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	MATERIAL												
	10/16/15	0941	X		X	Room 735	X	X	X	X	X	X	X	X	X	X	X	X	X
	11/4/15	1001	X		X	Hall outside room 841	X	X	X	X	X	X	X	X	X	X	X	X	X
	10/2/15	1316	X		X	PC2	X	X	X	X	X	X	X	X	X	X	X	X	X
	10/2/15	1316	X		X	PC2	X	X	X	X	X	X	X	X	X	X	X	X	X
	9/24/15	1503	X		X	Ground floor mech room	X	X	X	X	X	X	X	X	X	X	X	X	X
	9/24/15	1458	X		X	Ground floor mech room	X	X	X	X	X	X	X	X	X	X	X	X	X
	10/2/15	1457	X		X	Room 314B	X	X	X	X	X	X	X	X	X	X	X	X	X
	10/2/15	1459	X		X	Room 314C	X	X	X	X	X	X	X	X	X	X	X	X	X
	10/16/15	1446	X		X	Room 802	X	X	X	X	X	X	X	X	X	X	X	X	X
	10/16/15	1446	X		X	Room 802	X	X	X	X	X	X	X	X	X	X	X	X	X

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Date: 12/8/15
(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	Time: 1000
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Comments:	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. **47320**

PROJECT NUMBER	PROJECT NAME		INSPECTOR		PARAMETERS				TURNAROUND TIME									
	DATE	TIME	TYPE	GRAB	SAMPLE LOCATION	PLM EPA 600/R93/16 (POSITIVE STOP)	PLM EPA 600/R93/16 (W/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
244600.0001.0000			Gregory Kaczynski															
176	9/21/15	1112	X	X	Room 7	X		X								X		
177	9/21/15	1112	X	X	Room 7		X	X										
178	9/21/15	1158	X	X	Room 8	X		X										
179	9/21/15	1158	X	X	Room 8		X	X										
180	9/21/15	1352	X	X	Room 14B	X		X										
181	9/21/15	1350	X	X	Room 14B	X		X										
182	9/21/15	1414	X	X	Room 14A	X		X										
183	9/21/15	1415	X	X	Room 14A		X	X										
184	9/25/15	1430	X	X	Room 149	X		X										
185	10/15/15	1050	X	X	Room 649	X		X										

Relinquished by: (Signature) 	Date:	12/8/2015	Received by: (Signature) 	12/18/15
	(Printed)	Gregory Kaczynski	(Printed)	Amanda Parkins
Remarks:	Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Comments:		



ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

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Edition: October 2009
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LAB ID #. 47320

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME											
						PLM EPA 600/R93/116 (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	8hr	24hr	48hr	3day	5day				
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	MATERIAL	PLM EPA 600/R93/116 (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	TURNAROUND TIME									
										COMP	GRAH	8hr	24hr	48hr	3day	5day			
186	9/24/15	1545	X	Room 16		X	X												
187	9/24/15	1605	X	Room 25		X	X												
188	9/25/15	1352	X	Room 160		X	X												
189	9/28/15	0930	X	Room 126A		X	X												
190	10/2/15	1147	X	Room 328B		X	X												
191	10/2/15	1522	X	Room 309		X	X												
192	10/7/15	0930	X	Room 305		X	X												
193	10/7/15	1103	X	Room 409		X	X												
194	9/25/15	1145	X	Room 103		X	X												
195	9/28/15	1040	X	Room 112		X	X												

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Date: 12/18/15
(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	Time: 1000
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Page 21 of 41	



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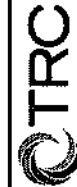
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. 47320

PROJECT NUMBER	PROJECT NAME	PARAMETERS				TURNAROUND TIME								
		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day	
244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT	X		X										
INSPECTOR Gregory Kaczynski		MATERIAL												
FIELD SAMPLE NUMBER	DATE	TIME	TYPE		SAMPLE LOCATION	MATERIAL								
			COMP	GRAB			FT11-12x12 dark tan with dark & light tan streaks/black mastic	FT11-12x12 dark tan with dark & light tan streaks/black mastic	FT12-12x12 green with small black and white flacks/black mastic	FT12-12x12 green with small black and white flacks/black mastic	FT13-12x12 light brown floor tile/black mastic	FT13-12x12 light brown floor tile/black mastic	FT14-12x12 dark grey with white/pink/blue confetti/yellow glue	FT14-12x12 dark grey with white/pink/blue confetti/yellow glue
204	9/28/15	1525	X	X	Room 225		X							
205	9/28/15	1402	X	X	Room 241		X							
206	9/28/15	1450	X	X	Room 211	X								
207	9/28/15	1450	X	X	Room 211		X							
208	10/2/15	1019	X	X	Room 213	X								
209	10/2/15	1019	X	X	Room 213		X							
210	10/2/15	1051	X	X	Cafeteria	X								
211	10/2/15	1051	X	X	Cafeteria		X							

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Relinquished by: (Signature)	Date:	Received by: (Signature)
	Time: 0930	(Printed) Amanda Parkins	(Printed)	Time: 10 15	(Printed)
Remarks: Gregory Kaczynski		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Page 23 of 41	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. 47320

FIELD SAMPLE NUMBER	DATE	TIME	TYPE		SAMPLE LOCATION	PARAMETERS				TURNAROUND TIME									
			CONF	GRAB		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (W/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (PF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day		
PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT						INSPECTOR Gregory Kaczynski						MATERIAL							
212	10/2/15	1054	X	X	Cafeteria	X		X											
213	10/15/15	1001	X	X	Hall 650		X	X											
214	10/7/15	0957	X	X	Corridor 313C	X		X											
215	10/2/15	1423	X	X	Room 314B		X	X											
216	10/7/15	1015	X	X	Corridor 448	X		X											
217	10/7/15	1025	X	X	Hall outside room 427		X	X											
218	10/7/15	1026	X	X	Hall outside room 414B	X		X											
219	10/7/15	1052	X	X	Hall outside room 409		X	X											
220	10/7/15	1113	X	X	Corridor 413	X		X											

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Date: 12/14/15
(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	Time: 1000
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Comments:	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. 47320

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		PROJECT NAME INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME										
								PLM:	TEM:	8hr	24hr	48hr	3day	5day				
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (FF >1% & <10%)	TEM NY NOR 198.4 (FF PLM SERIES NEG)	MATERIAL						
												FT18-12x12 marble pattern floor tile/black mastic	FT19-12x12 white with pink & blue confetti floor tile/yellow glue	FT19-12x12 white with pink & blue confetti floor tile/yellow glue	FT20A-12x12 pink confetti border floor tile	FT20A-12x12 pink confetti border floor tile/yellow glue (FT20 A&B have the same glue)	FT20B-12x12 white w/ light grey confetti center floor tile/yellow glue (FT20 A&B have the same glue)	FT20B-12x12 white w/ light grey confetti center floor tile
221	10/7/15	1145	X	X	X	Room 426	X	X	X									
222	10/15/15	1130	X	X	X	Rec area 618	X	X	X									
223	10/16/15	0935	X	X	X	Hall outside 7 th floor nurses station	X	X	X									
224	10/15/15	1325	X	X	X	Hall outside room 648	X	X	X									
225	10/15/15	1314	X	X	X	Hall outside room 614A	X	X	X									
226	10/15/15	1327	X	X	X	6 th floor - outside exit to stair 1	X	X	X									
227	10/15/15	1026	X	X	X	Hall outside room 614A	X	X	X									
228	10/16/15	1300	X	X	X	8 th floor elevator lobby	X	X	X									

Relinquished by: (Signature) 	Date:	12/8/2015	Received by: (Signature)		Date:	12/18/15	Relinquished by: (Signature)		Received by: (Signature)	
	(Printed)	Gregory Kaczynski	Time:	0930	(Printed)	Amanda Parkins	(Printed)		(Printed)	
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Comments:						Page 25 of 41



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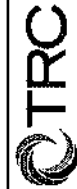
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
 Supersedes Previous Edition

LAB ID #. **47320**

PROJECT NUMBER	PROJECT NAME		INSPECTOR		PARAMETERS				TURNAROUND TIME							
	244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT		Gregory Kaczynski		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & Δ10%)	TEM NY N98.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day
SIGNATURE									MATERIAL							
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & Δ10%)	TEM NY N98.4 (IF PLM SERIES NEG)					
229	10/16/15	1251	X		X	Hall outside room 812	X	X	X			FT21A-9x9 black w/ white streaks border tile/yellow glue				
230	10/16/15	1252	X		X	Hall outside room 812	X		X			FT21B-9x9 white w/ black streaks center tile/yellow glue				
231	10/16/15	1302	X		X	8 th floor elevator lobby		X				FT21B-9x9 white w/ black streaks center tile				
232	10/16/15	1250	X		X	Hall outside room 812	X		X			FT22-12x12 maroon confetti (with some white confetti) floor tile/black mastic				
233	10/16/15	1256	X		X	Room 861		X	X			FT22-12x12 maroon confetti (with some white confetti) floor tile/black mastic				
234	11/4/15	1045	X		X	Hall outside room 827	X					FT24A-12x12 black with white confetti border floor tile				
235	11/4/15	1046	X		X	Hall outside room 833		X	X			FT24A-12x12 black with white confetti border floor tile/yellow glue				
236	11/4/15	1050	X		X	Room 827	X		X			FT24B-12x12 white confetti center floor tile/yellow glue				

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Date: 12/8/15	Relinquished by: (Signature)	Date:	Received by: (Signature)
(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	1000	(Printed)	Time:	(Printed)
Remarks:	Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Comments:		Page 26 of 41	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. 47320

PROJECT NUMBER	PROJECT NAME		INSPECTOR		PARAMETERS				TURNAROUND TIME											
	244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT		Gregory Kaczynski		PLM EPA 600/R93/16 (POSITIVE STOP)	PLM EPA 600/R93/16 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	48hr	3day	5day	
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAV	SAMPLE LOCATION				MATERIAL										
237	11/4/15	1051	X		X	Room 827	X													FT24B-12x12 white confetti center floor tile
238	11/4/15	0835	X		X	Hall outside room 835	X													FT25-12x12 cream w/ grey confetti floor tile/grey glue
239	11/4/15	1121	X		X	Hall outside room 835	X													FT25-12x12 cream w/ grey confetti floor tile/grey glue
240	11/4/15	1259	X		X	Connector	X													FT26-12x12 tan confetti w/ "grip" texture floor tile/black mastic
241	11/4/15	1301	X		X	Connector	X													FT26-12x12 tan confetti w/ "grip" texture floor tile/black mastic
242	11/4/15	1435	X		X	Elevator	X													FT27-12x12 black with white confetti floor tile/black & tan mastic
243	11/4/15	1426	X		X	Elevator	X													FT27-12x12 black with white confetti floor tile/black & tan mastic

Relinquished by: (Signature) 	Date: 12/8/2015	Received by: (Signature) 	Date: 12/18/15
(Printed) Gregory Kaczynski	Time: 0930	(Printed) Amanda Parkins	Time: 1000
Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
Remarks:			



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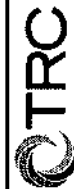
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. 47320

FIELD SAMPLE NUMBER	DATE	TIME	TYPE		SAMPLE LOCATION	PARAMETERS					TURNAROUND TIME						
			COMP	GRAB		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (% Gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	24hr	48hr	3day	48hr	3day
PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT						INSPECTOR Gregory Kaczynski											
PROJECT NUMBER 244600.0001.0000						MATERIAL											
244	9/24/15	1600	X	X	Room 19	X		X			X						
245	9/21/15	1045	X	X	Room 4	X		X			X						
246	9/28/15	1037	X	X	Room 112	X		X			X						
247	9/25/15	1331	X	X	Room 158	X		X			X						
248	9/25/15	1457	X	X	Room 170	X		X			X						
249	9/25/15	1524	X	X	Room 120	X		X			X						
250	9/28/15	1523	X	X	Room 225	X		X			X						
251	9/28/15	1410	X	X	Room 241	X		X			X						
252	9/28/15	1311	X	X	Room 209	X		X			X						
253	10/2/15	0923	X	X	Room 234A	X		X			X						
254	10/15/15	1325	X	X	Hall outside 615B	X		X			X						

Relinquished by: (Signature) 	Date: 1/7/2016	Received by: (Signature) 	Date: 11/7/16
(Printed) Gregory Kaczynski	Time: 1015	(Printed) Amanda Parkins	Time: 1200
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Comments:	



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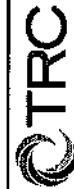
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. 47320

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME										
						PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	8hr	24hr	48hr	3day	5day		
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	SAMPLE LOCATION	MATERIAL											
								255	10/15/15	1345	X	X	X	Room 627	PLI-plaster-white skimcoat/tan basecoat	X		
256	10/15/15	1355	X	X	X	Hall outside room 630	PLI-plaster-white skimcoat/tan basecoat	X										
257	10/7/15	0920	X	X	X	Room 307	PLI-plaster-white skimcoat/tan basecoat	X										
258	10/7/15	0948	X	X	X	Room 337	PLI-plaster-white skimcoat/tan basecoat	X										
259	10/2/15	1509	X	X	X	Room 312	PLI-plaster-white skimcoat/tan basecoat	X										
260	10/2/15	1447	X	X	X	Corridor 316	PLI-plaster-white skimcoat/tan basecoat	X										
261	10/15/15	1443	X	X	X	Hall outside room 746	PLI-plaster-white skimcoat/tan basecoat	X										
262	10/16/15	1104	X	X	X	Hall outside room 748	PLI-plaster-white skimcoat/tan basecoat	X										
263	10/16/15	1002	X	X	X	Room 706	PLI-plaster-white skimcoat/tan basecoat	X										
264	10/16/15	0920	X	X	X	Room 718	PLI-plaster-white skimcoat/tan basecoat	X										
265	10/7/15	1043	X	X	X		PLI-plaster-white skimcoat/tan basecoat	X										

Relinquished by: (Signature) 	Date: 1/7/2016	Received by: (Signature) 	Date: 11/7/16
(Printed) Gregory Kaczynski	Time: 1015	(Printed) Amanda Parkins	Time: 1200
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Comments:	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. **47320**

FIELD SAMPLE NUMBER	DATE	TIME	TYPE		PROJECT NAME	PARAMETERS				TURNAROUND TIME											
			COMB	GRAB		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & >10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day				
SIGNATURE					INSPECTOR	Gregory Kaczynski				MATERIAL											
PROJECT NUMBER			244600.0001.0000		DCS-Bridgeport Mental Health Center, Bridgeport, CT																
277	9/28/15	1455	X	X	Room 255	X															
278	10/15/15	1346	X	X	Room 630	X															
279	10/15/15	1359	X	X	Room 619A	X															
280	11/4/15	0945	X	X	Room 826	X															
281	10/16/15	1506	X	X	Room 819	X															
282	9/25/15	1155	X	X	Room 106A	X															
283	9/25/15	1157	X	X	Room 106A	X															
284	10/15/15	1541	X	X	Pantry 737	X															
285	10/15/15	1540	X	X	Pantry 737	X															
286	10/2/15	1506	X	X	Room 312	X															
287	10/2/15	1506	X	X	Room 312	X															

Relinquished by: (Signature) 	Date:	1/7/2016	Received by: (Signature)		1/7/16	Relinquished by: (Signature)		Date:		Received by: (Signature)	
	(Printed) Gregory Kaczynski	Time:	1015	(Printed) Amanda Parkins	1300	(Printed)		Time:		(Printed)	
Remarks:				Condition of Samples: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No						Page 31 of 41	



21 GRIFFIN ROAD NORTH
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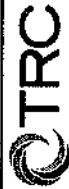
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersedes Previous Edition

LAB ID #. **47320**

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		INSPECTOR Gregory Kaczynski		PARAMETERS		TURNAROUND TIME											
						PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ Gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (R > 1% & < 10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day		
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	MATERIAL	MATERIAL	MATERIAL												
								COMP	GRAB										
288	10/7/15	1357	X	Room 419	SU2-light purple sink undercoating		X												
289	10/7/15	1355	X	Room 419	SU2-light purple sink undercoating		X												
290	10/7/15	1506	X	Room 546	BFC1-brown floor coating with aggregate		X												
291	10/7/15	1508	X	Room 546	BFC1-brown floor coating with aggregate		X												
292	10/2/15	1509	X	Room 312	S1-tan sink putty		X												
293	10/2/15	1507	X	Room 312	S1-tan sink putty		X												
294	9/24/15	1140	X	4 th floor mech room	FC1-cloth flex connector		X												
295	9/24/15	0920	X	8 th floor mech room	FC1-cloth flex connector		X												
296	9/24/15	1142	X	4 th floor mech room	DW1-cloth/foil paper/yellow glue duct covering (over fiberglass insulation)		X		X										
297	9/24/15	0912	X	8 th floor mech room	DW1-cloth/foil paper/yellow glue duct covering (over fiberglass insulation)		X		X										

Relinquished by: (Signature) 	Date: 1/7/2016	Received by: (Signature) 	Date: 11/7/16
(Printed) Gregory Kaczynski	Time: 1015	(Printed) Amanda Parkins	Time: 1200
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Comments:	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
Supersedes Previous Edition

LAB ID #. **47220**

PROJECT NUMBER	PROJECT NAME		INSPECTOR	PARAMETERS		TURNAROUND TIME								
	DATE	TIME		PLM EPA 600/R93/116 (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY N98 198.4 (IF PLM SERIES NEG)	PLM:	TEM:	8hr	24hr	48hr	3day	5day
244600.0001.0000	9/24/15	1059	Gregory Kaczynski	PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (w/ gravimetric reduction) (POSITIVE STOP)									
FIELD SAMPLE NUMBER	DATE	TIME	INSPECTOR	TYPE	COMP	GRAV	SAMPLE LOCATION	MATERIAL						
316	9/24/15	1059	Gregory Kaczynski	X	X	X	6 th floor mech room	DS3-white seam sealant on outside of fiberglass duct insulation on seams						
317	9/24/15	1328	Gregory Kaczynski	X	X	X	3 rd floor mech room	DS4-grey, hard duct sealant on corner seams of bare metal duct						
318	9/24/15	1415	Gregory Kaczynski	X	X	X	1 st floor mech room	DS4-grey, hard duct sealant on corner seams of bare metal duct						
319	9/25/15	0926	Gregory Kaczynski	X	X	X	Room 39	DS5-grey, putty sealant in between duct seams						
320	9/25/15	0926	Gregory Kaczynski	X	X	X	Room 39	DS5-grey, putty sealant in between duct seams						
321	9/21/15	1403	Gregory Kaczynski	X	X	X	Room 20	GR1-tan grout between 1.5" ceramic floor tile						
322	9/21/15	1404	Gregory Kaczynski	X	X	X	Room 20	GR1-tan grout between 1.5" ceramic floor tile						
323	9/21/15	1405	Gregory Kaczynski	X	X	X	Room 20	GR2-cream grout under 1.5" ceramic floor tile						
324	9/21/15	1406	Gregory Kaczynski	X	X	X	Room 20	GR2-cream grout under 1.5" ceramic floor tile						
325	9/21/15	1320	Gregory Kaczynski	X	X	X	Stair 12	GR3-hard dark grey grout between large slate tiles						

Relinquished by: (Signature)	Date: 1/7/2016	Received by: (Signature)	Date: 1/7/14
(Printed) Gregory Kaczynski	Time: 1015	(Printed) Amanda Parkins	Time: 1200
Remarks:	Condition of Samples: <input checked="" type="checkbox"/> Acceptable; Yes <input type="checkbox"/> No <input type="checkbox"/> Comments:		



Edition: October 2009
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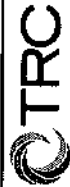
ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

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LAB ID # 47320

FIELD SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	PARAMETERS				TURNAROUND TIME								
					PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (W/ gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (FF >1% & <10%)	TEM NY NOB 198.4 (IF PLM SERIES NEG)	PLM:	8hr	24hr	48hr	3day	5day		
PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT				INSPECTOR Gregory Kaczynski													
PROJECT NUMBER 244600.0001.0000																	
SIGNATURE																	
337	10/2/15	1355	X	Kitchen 318	X												
338	9/28/15	0919	X	Entry 113	X												
339	9/21/15	1406	X	Stairwell 12													
340	9/21/15	1408	X	Stairwell 12	X												
341	9/21/15	1407	X	Stairwell 12													
342	9/24/15	0950	X	8 th floor mech room	X												
343	9/24/15	1200	X	4 th floor mech room	X												
344	9/24/15	1203	X	4 th floor mech room	X												
345	9/24/15	0953	X	8 th floor mech room	X												
346	9/24/15	1333	X	3 rd floor mech room	X												
347	9/24/15	1028	X	7 th floor mech room	X												

Relinquished by: (Signature)	Date: 1/7/2016	Received by: (Signature)	Date: 1/7/14
(Printed) Gregory Kaczynski	Time: 1015	(Printed) Amanda Parkins	Time: 1200
Remarks:		Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
		Comments:	



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
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LAB ID #. **47320**

PROJECT NUMBER	PROJECT NAME		INSPECTOR		PARAMETERS				TURNAROUND TIME							
	244600.0001.0000	DCS-Bridgeport Mental Health Center, Bridgeport, CT		Gregory Kaczynski		PLM EPA 600/R93/116 (POSITIVE STOP)	PLM EPA 600/R93/116 (W/gravimetric reduction) (POSITIVE STOP)	ANALYZE BY LAYER	POINT COUNT (IF >1% & <10%)	TEM NY NOB 1984 (IF PLM SERIES NEG)	PLM:	8hr	24hr	48hr	3day	
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAE	SAMPLE LOCATION				MATERIAL						
369	9/21/15	1428	X		X	Stairwell 6	X									CBG1-dark brown brittle cove base glue
370	9/28/15	1345	X		X	Room 205	X									CBG1-dark brown brittle cove base glue
371	10/15/15	1022	X		X	Room 612	X									CBG1-dark brown brittle cove base glue
372	9/25/15	0948	X		X	Ground floor - corridor 37	X									CBG2-cream cove base glue
373	9/21/15	1105	X		X	Room 4	X									CBG2-cream cove base glue
374	9/21/15	1108	X		X	Corridor 6	X									CBG3-tan cove base glue
375	9/21/15	1108	X		X	Corridor 6	X									CBG3-tan cove base glue
376	9/21/15	1157	X		X	Room 8	X									CBG4-grey cove base glue
377	9/24/15	1555	X		X	Room 25	X									CBG4-grey cove base glue
378	9/21/15	1320	X		X	Room 14B	X									CBG5-cream cove base glue (renovated area)
379	9/21/15	1323	X		X	Room 14B	X									CBG5-cream cove base glue (renovated area)

Relinquished by: (Signature) 	Date: 1/7/2016	Received by: (Signature) 	Date: 11/7/14	Relinquished by: (Signature)	Date:	Received by: (Signature)
	Time: 1015	(Printed) Amanda Parkins	Time: 1300	(Printed)	Time:	(Printed)
Remarks: Gregory Kaczynski				Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
				Comments:		



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ASBESTOS BULK SAMPLING CHAIN OF CUSTODY

Edition: October 2009
 Supersede Previous Edition

LAB ID #. **47320**

PROJECT NUMBER 244600.0001.0000		PROJECT NAME DCS-Bridgeport Mental Health Center, Bridgeport, CT		PARAMETERS PLM EPA 600/R93/116 (POSITIVE STOP) (w/ gravimetric reduction) (POSITIVE STOP) ANALYZE BY LAYER POINT COUNT (IF >1% & <=10%) TEM NY NOB 198.4 (IF PLM SERIES NEG)					TURNAROUND TIME				
		INSPECTOR Gregory Kaczynski							SAMPLE LOCATION		8hr	24hr	48hr
FIELD SAMPLE NUMBER	DATE	TIME	TYPE	COMP	GRAB	MATERIAL							
	9/25/15	1130	X	X	Corridor 102								
381	9/28/15	1545	X	X	Room 231	CBG6-clear, yellow sticky glue							
							CBG6-clear, yellow sticky glue						

SIGNATURE

Relinquished by: (Signature) 	Date:	1/7/2016	Received by: (Signature)		Date:	1/7/16	Relinquished by: (Signature)		Received by: (Signature)		
	(Printed) Gregory Kaczynski	Time:	1015	(Printed) Amanda Parkins	(Printed)	1200	(Printed)		(Printed)		
Remarks:											
Condition of Samples: Acceptable: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>								Comments:			Page 41 of 41

PLM Gravimetric Analysis

Date	Analyst	Lab Log #	Sample ID	Crucible ID	g crucible	g crucible plus sample	g after 480°	decimal	% Asb	
									in residue	total Sample
1/18/2016	AP	47454	118	1	19.8495	19.9671	19.9417	0.784	0.00	0.00
			120	2	24.606	24.7304	24.6732	0.540	0.00	0.00
			123	3	20.3435	20.4107	20.3791	0.530	0.00	0.00
			125	4	19.3205	19.3283	19.3259	0.692	0.00	0.00
			127	5	29.4881	29.5221	29.5076	0.574	0.00	0.00
			129	6	22.1267	22.1354	22.1311	0.506	0.00	0.00
			131	7	20.4277	20.4328	20.431	0.647	0.00	0.00
			133	8	23.1576	23.2241	23.2071	0.744	0.00	0.00
			135	9	19.7061	19.7533	19.7419	0.758	0.00	0.00
			137	10	18.1524	18.196	18.1689	0.378	0.00	0.00
			139	11	27.2578	27.2824	27.2708	0.528	0.00	0.00
			141	12	18.1016	18.1188	18.1136	0.698	3.00	2.09
			147	13	21.9584	22.0118	21.9902	0.596	0.00	0.00
			151	14	19.7749	19.8417	19.8132	0.573	0.00	0.00
			154	15	20.4418	20.5168	20.472	0.403	0.00	0.00
			156	16	18.9647	19.0724	19.0219	0.531	0.00	0.00
			181M	17	23.5525	23.5707	23.5647	0.670	0.00	0.00
			181T	18	18.5529	18.5826	18.5787	0.869	0.00	0.00
			183M	19	18.59	18.62	18.611	0.750	0.00	0.00
			183T	20	23.6787	23.7198	23.7129	0.832	0.00	0.00
			189M	21	19.8384	19.8627	19.854	0.642	0.00	0.00
			189T	22	17.2878	17.3117	17.3073	0.816	0.00	0.00
			192M	23	23.4939	23.5519	23.5332	0.678	0.00	0.00
			192T	24	18.2263	18.2688	18.2623	0.847	0.00	0.00
			197T	25	23.9838	24.3996	24.3328	0.839	0.00	0.00
			199M	26	23.7359	23.7674	23.7559	0.635	0.00	0.00

PLM Gravimetric Analysis

Date	Analyst	Lab Log #	Sample ID	Crucible ID	g crucible	g crucible plus sample	g after 480°	decimal Residue	% Asb in residue	% Asb total Sample
			199T	27	20.3848	20.4574	20.4454	0.835	0.00	0.00
			203GI	28	28.0633	28.0775	28.0698	0.458	0.00	0.00
			203T	29	19.9916	20.0447	20.0335	0.789	0.00	0.00
			211GI	30	18.8385	18.8604	18.8457	0.329	0.00	0.00
			211T	31	19.5555	19.6269	19.6184	0.881	0.00	0.00
			217GI	32	18.9533	19.0141	18.981	0.456	0.00	0.00
			217T	33	18.0724	18.1786	18.1615	0.839	0.00	0.00
			219T	34	17.3657	17.3996	17.3942	0.841	0.00	0.00
			223GI	35	18.6313	18.6553	18.647	0.654	0.00	0.00
			223T	36	17.3547	17.6098	17.5772	0.872	0.00	0.00
			225GI	37	20.5337	20.646	20.6239	0.803	0.00	0.00
			225T	38	20.4918	20.6225	20.6034	0.854	0.00	0.00
			227T	39	19.5542	19.6317	19.6198	0.846	0.00	0.00
			229GI	40	21.369	21.394	21.3818	0.512	0.00	0.00
			229T	41	20.5559	20.6332	20.6214	0.847	0.00	0.00
			231T	42	20.7698	20.8286	20.819	0.837	0.00	0.00
			235GI	43	22.2326	22.2969	22.2704	0.588	0.00	0.00
			235T	44	26.4272	26.475	26.4677	0.847	0.00	0.00
			237T	45	19.7356	19.7897	19.7815	0.848	0.00	0.00
			239GI	46	26.4463	26.4572	26.4533	0.642	0.00	0.00
			239T	47	20.3938	20.428	20.4222	0.830	0.00	0.00
			275	48	19.4813	19.5883	19.546	0.605	0.00	0.00
			283	49	20.9984	21.02	21.0155	0.792	0.00	0.00
			287	50	17.3712	17.3898	17.3863	0.812	0.00	0.00
			291	51	16.8792	16.9358	16.9282	0.866	0.00	0.00
			293	52	17.3558	17.3978	17.392	0.862	0.00	0.00

PLM Gravimetric Analysis

Date	Analyst	Lab Log #	Sample ID	Crucible ID	g crucible	g crucible plus sample	g after 480°	decimal Residue	% Asb in residue	% Asb total Sample
			297GI	53	25.6872	25.6943	25.6906	0.479	0.00	0.00
			301GI	55	24.2078	24.2194	24.2133	0.474	0.00	0.00
			303GI	57	19.0171	19.0426	19.0271	0.392	0.00	0.00
			310	59	25.596	25.6513	25.632	0.651	0.00	0.00
			313	60	20.5597	20.6663	20.6212	0.577	0.00	0.00
			315	61	19.7759	19.8056	19.7946	0.630	0.00	0.00
			318	62	18.8028	18.8865	18.8547	0.620	0.00	0.00
			320	63	26.9087	26.9424	26.9307	0.653	0.00	0.00
			336	64	27.6817	27.734	27.7187	0.707	0.00	0.00
			339	65	17.8698	17.9512	17.8986	0.354	0.00	0.00
			341	66	19.6005	19.7135	19.6934	0.822	0.00	0.00
			343	67	29.5487	29.6041	29.5893	0.733	5.00	3.66
			345	68	21.2009	21.2292	21.2168	0.562	3.00	1.69
			347	69	26.4786	26.5765	26.5347	0.573	0.00	0.00
			349	70	22.9872	23.0657	23.0154	0.359	0.00	0.00
			351	71	18.6186	18.638	18.6292	0.546	3.00	1.64
			367	72	20.0848	20.1214	20.0945	0.265	0.00	0.00
			369	73	17.7672	17.8237	17.8005	0.589	0.00	0.00
			373	74	20.3762	20.4346	20.4177	0.711	0.00	0.00
			375	75	26.841	26.8847	26.8689	0.638	0.00	0.00
			377	76	24.8864	24.9555	24.9392	0.764	0.00	0.00
			379	77	19.2947	19.3316	19.3171	0.607	0.00	0.00
			381	78	17.5054	17.5759	17.5411	0.506	0.00	0.00