

PROJECT MANUAL

Volume One

Renovate Mechanical/Electrical/Life Safety

Jefferson State Office Building

205 Jefferson Street

Jefferson City, Missouri

Designed By: McClure Engineering
1000 Clark Ave
St. Louis, MO 63102

Date Issued: August 31, 2023

Project No.: O1911-01

STATE *of* MISSOURI



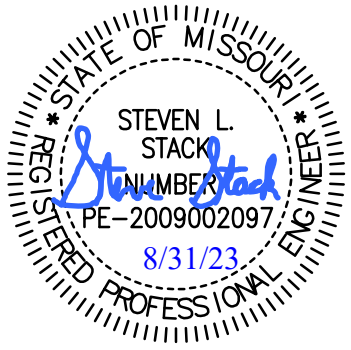

OFFICE *of* ADMINISTRATION
Facilities Management, Design & Construction

Jefferson State Office Building
Renovate Mechanical/Electrical/Life Safety
State Office Building

SECTION 000107 - PROFESSIONAL SEALS AND CERTIFICATIONS

PROJECT NUMBER: O1911-01

THE FOLLOWING DESIGN PROFESSIONALS HAVE SIGNED AND SEALED THE ORIGINAL PLANS AND SPECIFICATIONS FOR THIS PROJECT, WHICH ARE ON FILE WITH THE DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION:

<p>ARCHITECTURAL: Arcturis 701 Market Street, Suite 1300 St. Louis, MO 63101 T (314) 206-7100</p>  <p>Michael J. Ratliff A-6855</p>	<p>I hereby certify that Drawings: <u>G-001 - A809</u> and Specifications <u>Division 02 - 12</u> have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these drawing and/or specifications are as required by and in compliance with building codes of the State of Missouri</p> <p>Signature <u></u></p>
<p>STRUCTURAL: Archer-Elgin Surveying and Engineering 310 E. 6th St. Rolla, MO 65401 T (573) 364-6362 F (573) 364-4782</p>  <p>Steven L. Stack MO PE-2009002097</p>	<p>I hereby certify that Drawings: <u>S1.0 - S2.0</u> and or Specifications: <u>Divisions 31 - 32</u> have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these drawing and/or specifications are as required by and in compliance with building codes of the State of Missouri</p> <p>Signature <u></u></p>

Jefferson State Office Building
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State Office Building

MECHANICAL:

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F (314) 645-4128



Eric A. Reuther
PE2011015792

I hereby certify that Drawings: M0.1 - M6.4 and Specifications Division 23 has been prepared by me, or under my supervision. I further certify that to the best of my knowledge these drawing and/or specifications are as required by and in compliance with building codes of the State of Missouri

Signature *Philip Wentz*

PLUMBING:

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Eric A. Reuther
PE2011015792

I hereby certify that Drawings: P1.0 - P7.0 & FP 0.1 - FP 3.14 and Specifications Division 21 - 22 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these drawing and/or specifications are as required by and in compliance with building codes of the State of Missouri

Signature *Philip Wentz*

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Phil J. Wentz
E-29111

I hereby certify that Drawings: ESS 0.9 - E3.15 and Specifications Division 26 - 28 have been prepared by me, or under my supervision. I further certify that to the best of my knowledge these drawing and/or specifications are as required by and in compliance with building codes of the State of Missouri

Signature *Philip Wentz*

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SECTION 000115 – LIST OF DRAWINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section provides a comprehensive list of the drawings that comprise the Bid Documents for this project.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 LIST OF DRAWINGS

- A. The following list of drawings is a part of the Bid Documents:

	<u>Title</u>	<u>Sheet #</u>	<u>Date</u>
	<u>VOLUME ONE</u>		
	<u>GENERAL</u>		
1	VOLUME ONE COVER SHEET	G-001.1	8/31/2023
2	CONTRACTOR STORAGE & PROJECT PHASING	G-002	8/31/2023
3	SYMBOLS, ABBREVIATIONS, & NOTES	A-000	8/31/2023
4	LIFE SAFETY PLAN - BASEMENT	A-001	8/31/2023
5	LIFE SAFETY PLAN - 1ST FLOOR	A-002	8/31/2023
6	LIFE SAFETY PLAN - 2ND & 3RD FLOORS	A-003	8/31/2023
7	LIFE SAFETY PLAN - 4TH & 5TH FLOORS	A-004	8/31/2023
8	LIFE SAFETY PLAN - 6TH & 7TH FLOORS	A-005	8/31/2023
9	LIFE SAFETY PLAN - 8TH & 9TH FLOORS	A-006	8/31/2023
10	LIFE SAFETY PLAN - 10TH & 11TH FLOORS	A-007	8/31/2023
11	LIFE SAFETY PLAN - 12TH & 13TH FLOORS	A-008	8/31/2023
12	LIFE SAFETY PLAN - 14TH FLOOR	A-009	8/31/2023
13	ACCESSIBILITY LEGEND - GENERAL	A-010	8/31/2023
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17	PHASE 1 - 13TH FLOOR SWING SPACE	A-015	8/31/2023
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22	ALTERNATE #3 - ELEVATOR LOBBY UPGRADES	A-020	8/31/2023

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29	DEMOLITION PLAN - 10TH & 11TH FLOORS	A-106	8/31/2023
30	DEMOLITION PLAN - 12TH & 13TH FLOORS	A-107	8/31/2023
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91	THIRD FLOOR PLAN - MECHANICAL - DEMOLITION	MD3.3	8/31/2023
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104	NINTH FLOOR PLAN - MECHANICAL	M3.9	8/31/2023
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119	AIRFLOW DIAGRAM	M5.5	8/31/2023
120	FLAT PHASING DIAGRAM	M5.6	8/31/2023
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123	MECHANICAL DETAILS	M6.0	8/31/2023
124	MECHANICAL SCHEDULES	M6.1	8/31/2023
125	MECHANICAL SCHEDULES	M6.2	8/31/2023
126	MECHANICAL SCHEDULES	M6.3	8/31/2023

127	MECHANICAL SCHEDULES	M6.4	8/31/2023
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133	FOURTH – SEVENTH FLOOR PLAN - PLUMBING - DEMOLITION	PD3.3	8/31/2023
134	EIGHTH – TWELFTH FLOOR PLAN - PLUMBING - DEMOLITION	PD3.4	8/31/2023
135	THIRTEENTH FLOOR PLAN - PLUMBING - DEMOLITION	PD3.5	8/31/2023
136	FOURTEENTH FLOOR PLAN - PLUMBING - DEMOLITION	PD3.6	8/31/2023
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138	FIRST FLOOR PLAN - PLUMBING	P3.1	8/31/2023
139	SECOND - TWELFTH FLOOR PLAN - PLUMBING	P3.2	8/31/2023
140	THIRTEENTH FLOOR PLAN - PLUMBING	P3.3	8/31/2023
141	FOURTEENTH FLOOR PLAN - PLUMBING	P3.4	8/31/2023
142	PLUMBING ALT. #1 - ENLARGED FLOOR PLANS	P4.0	8/31/2023
143	PLUMBING ALT. #1 - ENLARGED FLOOR PLANS	P4.1	8/31/2023
144	PLUMBING SCHEDULES AND DETAILS	P5.0	8/31/2023
145	PLUMBING RISER DIAGRAMS	P7.0	8/31/2023
FIRE PROTECTION - GENERAL			
146	SYMBOLS AND ABBREVIATIONS	FP0.1	8/31/2023
147	FIRST FLOOR PLAN - FIRE PROTECTION	FP3.1	8/31/2023
148	SECOND FLOOR PLAN - FIRE PROTECTION	FP3.2	8/31/2023
149	THIRD FLOOR PLAN - FIRE PROTECTION	FP3.3	8/31/2023
150	FOURTH FLOOR PLAN - FIRE PROTECTION	FP3.4	8/31/2023
151	FIFTH FLOOR PLAN - FIRE PROTECTION	FP3.5	8/31/2023
152	SIXTH FLOOR PLAN - FIRE PROTECTION	FP3.6	8/31/2023
153	SEVENTH FLOOR PLAN - FIRE PROTECTION	FP3.7	8/31/2023
154	EIGHTH FLOOR PLAN - FIRE PROTECTION	FP3.8	8/31/2023
155	NINTH FLOOR PLAN - FIRE PROTECTION	FP3.9	8/31/2023
156	TENTH FLOOR PLAN - FIRE PROTECTION	FP3.10	8/31/2023
157	ELEVENTH FLOOR PLAN - FIRE PROTECTION	FP3.11	8/31/2023
158	TWELFTH FLOOR PLAN - FIRE PROTECTION	FP3.12	8/31/2023
159	THIRTEENTH FLOOR PLAN - FIRE PROTECTION	FP3.13	8/31/2023
160	FOURTEENTH FLOOR PLAN - FIRE PROTECTION	FP3.14	8/31/2023

<u>VOLUME THREE</u>			
161	VOLUME THREE COVER SHEET	G-001.3	8/31/2023
ELECTRICAL - SWING SPACE			
162	NINTH FLOOR PLANS - SWING SPACE	ESS 0.9	8/31/2023
163	ELEVENTH FLOOR PLANS - SWING SPACE	ESS 0.11	8/31/2023
164	THIRTEENTH FLOOR PLANS - SWING SPACE	ESS 0.13	8/31/2023
165	FOURTEENTH FLOOR PLANS - SWING SPACE	ESS 0.14	8/31/2023
ELECTRICAL - DEMOLITION			
166	ONE-LINE DEMOLITION	ED0.1	8/31/2023
167	BASEMENT FLOOR PLAN - DEMOLITION	ED1.0	8/31/2023
168	FIRST FLOOR PLAN- DEMOLITION	ED1.1	8/31/2023
169	SECOND FLOOR PLAN - DEMOLITION	ED1.2	8/31/2023
170	THIRD FLOOR PLAN - DEMOLITION	ED1.3	8/31/2023
171	FOURTH FLOOR PLAN - DEMOLITION	ED1.4	8/31/2023
172	FIFTH FLOOR PLAN - DEMOLITION	ED1.5	8/31/2023
173	SIXTH FLOOR PLAN - DEMOLITION	ED1.6	8/31/2023
174	SEVENTH FLOOR PLAN - DEMOLITION	ED1.7	8/31/2023
175	EIGHTH FLOOR PLAN - DEMOLITION	ED1.8	8/31/2023
176	NINTH FLOOR PLAN - DEMOLITION	ED1.9	8/31/2023
177	TENTH FLOOR PLAN - DEMOLITION	ED1.10	8/31/2023
178	ELEVENTH FLOOR PLAN - DEMOLITION	ED1.11	8/31/2023
179	TWELFTH FLOOR PLAN - DEMOLITION	ED1.12	8/31/2023
180	THIRTEENTH FLOOR PLAN - DEMOLITION	ED1.13	8/31/2023
181	FOURTEENTH FLOOR PLAN - DEMOLITION	ED1.14	8/31/2023
182	ROOF AND PENTHOUSE FLOOR PLANS - DEMOLITION	ED1.15	8/31/2023
ELECTRICAL - GENERAL			
183	SYMBOLS AND ABBREVIATIONS	E0.0	8/31/2023
184	LUMINAIRE SCHEDULE AND DETAILS	E0.1	8/31/2023
185	LIGHTING CONTROLS MATRIX AND DETAILS	E0.2	8/31/2023
186	ONE-LINE NEW WORK	E0.3	8/31/2023
187	POWER SCHEDULES DIAGRAMS AND DETAILS	E0.4	8/31/2023
188	MECHANICAL/ELECTRICAL SCHEDULE	E0.5	8/31/2023
189	FIRE ALARM RISER DIAGRAM	E0.6	8/31/2023
190	DATA RISER DIAGRAM	E0.7	8/31/2023
191	AUDIO - VISUAL DETAILS	E0.8	8/31/2023
192	AUDIO - VISUAL DETAILS	E0.9	8/31/2023
193	AUDIO - VISUAL DETAILS	E0.10	8/31/2023
LIGHTING			
194	BASEMENT FLOOR PLAN - LIGHTING	E1.0	8/31/2023

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195	FIRST FLOOR PLAN- LIGHTING	E1.1	8/31/2023
196	ALTERNATE BIDS FIRST FLOOR PLAN - LIGHTING	E1.1ALT	8/31/2023
197	SECOND FLOOR PLAN - LIGHTING	E1.2	8/31/2023
198	THIRD FLOOR PLAN - LIGHTING	E1.3	8/31/2023
199	FOURTH FLOOR PLAN - LIGHTING	E1.4	8/31/2023
200	FIFTH FLOOR PLAN - LIGHTING	E1.5	8/31/2023
201	SIXTH FLOOR PLAN - LIGHTING	E1.6	8/31/2023
202	SEVENTH FLOOR PLAN - LIGHTING	E1.7	8/31/2023
203	EIGHTH FLOOR PLAN - LIGHTING	E1.8	8/31/2023
204	NINTH FLOOR PLAN - LIGHTING	E1.9	8/31/2023
205	TENTH FLOOR PLAN - LIGHTING	E1.10	8/31/2023
206	ELEVENTH FLOOR PLAN - LIGHTING	E1.11	8/31/2023
207	TWELFTH FLOOR PLAN - LIGHTING	E1.12	8/31/2023
208	THIRTEENTH FLOOR PLAN - LIGHTING	E1.13	8/31/2023
209	FOURTEENTH FLOOR PLAN - LIGHTING	E1.14	8/31/2023
210	ROOF AND PENTHOUSE FLOOR PLANS - LIGHTING	E1.15	8/31/2023

POWER & DATA

211	BASEMENT FLOOR PLAN - POWER AND DATA	E2.0	8/31/2023
212	FIRST FLOOR PLAN - POWER AND DATA	E2.1	8/31/2023
213	ALTERNATE BIDS FIRST FLOOR PLAN - POWER AND DATA	E2.1ALT	8/31/2023
214	SECOND FLOOR PLAN - POWER AND DATA	E2.2	8/31/2023
215	THIRD FLOOR PLAN - POWER AND DATA	E2.3	8/31/2023
216	FOURTH FLOOR PLAN - POWER AND DATA	E2.4	8/31/2023
217	FIFTH FLOOR PLAN - POWER AND DATA	E2.5	8/31/2023
218	SIXTH FLOOR PLAN - POWER AND DATA	E2.6	8/31/2023
219	SEVENTH FLOOR PLAN - POWER AND DATA	E2.7	8/31/2023
220	EIGHTH FLOOR PLAN - POWER AND DATA	E2.8	8/31/2023
221	NINTH FLOOR PLAN - POWER AND DATA	E2.9	8/31/2023
222	TENTH FLOOR PLAN - POWER AND DATA	E2.10	8/31/2023
223	ELEVENTH FLOOR PLAN - POWER AND DATA	E2.11	8/31/2023
224	TWELFTH FLOOR PLAN - POWER AND DATA	E2.12	8/31/2023
225	THIRTEENTH FLOOR PLAN - POWER AND DATA	E2.13	8/31/2023
226	FOURTEENTH FLOOR PLAN - POWER AND DATA	E2.14	8/31/2023
227	ROOF AND PENTHOUSE FLOOR PLANS - POWER AND DATA	E2.15	8/31/2023

SYSTEMS

228	BASEMENT FLOOR PLAN - SYSTEMS	E3.0	8/31/2023
229	FIRST FLOOR PLAN - SYSTEMS	E3.1	8/31/2023
230	ALTERNATE BIDS FIRST FLOOR PLAN - SYSTEMS	E3.1ALT	8/31/2023
231	SECOND FLOOR PLAN - SYSTEMS	E3.2	8/31/2023
232	THIRD FLOOR PLAN - SYSTEMS	E3.3	8/31/2023
233	FOURTH FLOOR PLAN - SYSTEMS	E3.4	8/31/2023

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234	FIFTH FLOOR PLAN - SYSTEMS	E3.5	8/31/2023
235	SIXTH FLOOR PLAN - SYSTEMS	E3.6	8/31/2023
236	SEVENTH FLOOR PLAN - SYSTEMS	E3.7	8/31/2023
237	EIGHTH FLOOR PLAN - SYSTEMS	E3.8	8/31/2023
238	NINTH FLOOR PLAN - SYSTEMS	E3.9	8/31/2023
239	TENTH FLOOR PLAN - SYSTEMS	E3.10	8/31/2023
240	ELEVENTH FLOOR PLAN - SYSTEMS	E3.11	8/31/2023
241	TWELFTH FLOOR PLAN - SYSTEMS	E3.12	8/31/2023
242	THIRTEENTH FLOOR PLAN - SYSTEMS	E3.13	8/31/2023
243	FOURTEENTH FLOOR PLAN - SYSTEMS	E3.14	8/31/2023
244	ROOF AND PENTHOUSE FLOOR PLANS - SYSTEMS	E3.15	8/31/2023

END OF SECTION 000115

SECTION 001116 - INVITATION FOR BID

1.0 OWNER:

- A. The State of Missouri
Office of Administration,
Division of Facilities Management, Design and Construction
Jefferson City, Missouri

2.0 PROJECT TITLE AND NUMBER:

- A. Renovate Mechanical/Electrical/Life Safety
Jefferson State Office Building
205 Jefferson Street
Jefferson City, Missouri
Project No.: O1911-01

3.0 BIDS WILL BE RECEIVED:

- A. Until: 1:30 PM, January 25, 2024
- B. **Only electronic bids on MissouriBUYS shall be accepted: <https://missouribuys.mo.gov>. Bidder must be registered to bid.**

4.0 DESCRIPTION:

- A. Scope: The project includes full HVAC Renovation, plumbing riser and fixture replacement, fire alarm replacement, cubicle replacement or refurbishment in open areas and enclosed rooms as necessary, electrical power and low voltage to furniture, lighting and ADA Bathroom updates, carpeting, paint, power and horizontal data cabling, 13th floor data room decommissioning, lighting, security card access, breakroom modifications and expansions, first floor lobby updates, cafeteria updates (including furniture) and first floor modifications for DESE open office, conference/training center, furniture and new first floor ADA restroom as required by code. No upgrades or modifications to the fire sprinkler system are included in this scope other than sprinkler head modifications due to floor layout.
- B. MBE/WBE/SDVE Goals: MBE 10%, WBE 10%, and SDVE 3%. **NOTE: Only MBE/WBE firms certified by the State of Missouri Office of Equal Opportunity as of the date of bid opening, or SDVE(s) meeting the requirements of Section 34.074, RSMo and 1 CSR 30-5.010, can be used to satisfy the MBE/WBE/SDVE participation goals for this project.**

5.0 PRE-BID MEETING:

- A. Place/Time: 10:00 AM, January 4, 2024, at Jefferson State Office Building, 205 Jefferson Street, Jefferson City, MO in 11th Floor Conference Room
- B. Access to State of Missouri property requires presentation of a photo ID by all persons.

6.0 HOW TO GET PLANS & SPECIFICATIONS:

- A. View Only Electronic bid sets are available at no cost or paper bid sets for a deposit of \$200.00 from American Document Solutions (ADS). MAKE CHECKS PAYABLE TO: American Document Solutions. Mail to: American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433, <https://www.adsplanroom.net>. NOTE: Prime contractors will be allowed a maximum of two bid sets at the deposit rate shown above. Other requesters will be allowed only one bid set at this rate. Additional bid sets or parts thereof may be obtained by any bidder at the cost of printing and shipping by request to American Document Solutions at the address shown above. **Bidder must secure at least one bid set to become a planholder.**
- B. **Refunds: Return plans and specifications in unmarked condition within 15 working days of bid opening to American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433. Deposits for plans not returned within 15 working days shall be forfeited.**
- C. Information for upcoming bids, including downloadable plans, specifications, Invitation for Bid, bid tabulation, award, addenda, and access to the ADS planholders list, is available on the Division of Facilities Management, Design and Construction's web site: <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans>.

7.0 POINT OF CONTACT:

- A. Designer: McClure Engineering, Sarah Dollar, 314-806-0091, email: sdollar@mcclureeng.com
- B. Project Manager: Frank Cunningham, 573-395-6216, email: frank.cunningham@oa.mo.gov

8.0 GENERAL INFORMATION:

- A. The State reserves the right to reject any and all bids and to waive all informalities in bids. No bid may be withdrawn for a period of 20 working days subsequent to the specified bid opening time. The contractor shall pay not less than the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed, as determined by the Missouri Department of Labor and Industrial Relations and as set out in the detailed plans and specifications.
- B. Bid results will be available at <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans> after it is verified that at least one bid is awardable and affordable.

Very Important MissouriBUYS Instructions to Help Submit a Bid Correctly

- A. The bidder shall submit his or her bid and all supporting documentation on MissouriBUYS eProcurement System. No hard copy bids shall be accepted. Go to <https://missouribuys.mo.gov> and register. The bidder must register and complete a profile fully with all required documents submitted prior to submitting a bid.
- B. Once registered, log in.
1. Under "Solicitation" select "View Current Solicitations."
 2. Under "Filter by Agency" select "OA-FMDC-Contracts Chapter 8", then click "Filter Solicitation" button.
 3. Select "Active Solicitations" tab.
 4. To see the Solicitation Summary, click on the Project Number and the summary will open. Click each heading to open detailed information.
- C. Here are simplified instructions for uploading the bid to MissouriBUYS:
1. Find the solicitation by completing Steps 1 through 4 above.
 2. Select the three dots under "Actions." Select "Add New Response."
 3. When the Quote box opens, give the response a title and select "OK."
 4. The detailed solicitation will open. Select "Check All" for the Original Solicitation Documents, open each document, and select "Accept." If this step is not completed, a bid cannot be uploaded. Scroll to the bottom of the page and select "Add Attachments." If you do not see this command, not all documents have been opened and accepted.
 5. The Supplier Attachments box will open. Select "Add Attachment" again.
 6. The Upload Documents box will open. Read the instructions for uploading. Disregard the "Confidential" check box.
 7. Browse and attach up to 5 files at a time. Scroll to bottom of box and select "Upload." The Supplier Attachments box will open. Repeat Steps 5 through 7 if more than 5 files are to be uploaded.
 8. When the Supplier Attachments box opens again and uploading is complete, select "Done." A message should appear that the upload is successful. If it does not, go to the Bidder Response tab and select "Submit."
 9. The detailed solicitation will open. At the bottom select "Close."
 10. Ensure receipt of notifications including current e-mail address are enabled within vendor profile.
- D. Any time a bidder wants to modify the bid, he or she will have to retract, make revisions, and then submit again. Please ensure that "draft" status is not shown. FMDC will open the last response the bidder submits. The bidder may revise and submit the bid up to the close of the solicitation (bid date and time). Be sure to allow for uploading time so that the bid is successfully uploaded prior to the 1:30 PM deadline; we can only accept the bid if it is uploaded before the deadline.
- E. If you want to verify that you are uploading documents correctly, please contact Paul Girouard: 573-751-4797, paul.girouard@oa.mo.gov ; April Howser: 573-751-0053, April.Howser@oa.mo.gov ; or Mandy Roberson: 573-522-0074, Mandy.Roberson@oa.mo.gov.
- F. If you are experiencing login issues, please contact Web Procure Support (Proactis) at 866-889-8533 anytime from 7:00 AM to 7:00 PM Central Time, Monday through Friday. If you try using a userid or password several times that is incorrect, the system will lock you out. Web Procure Support is the only option to unlock you! If you forget your userid or password, Web Procure Support will provide a temporary userid or password. Also, if it has been a while since your last successful login and you receive an "inactive" message, contact Web Procure (Proactis). If you are having a registration issue, you may contact Office of Administration Division of Accounting at 573-751-2971 and ask for the MissouriBUYS vendor team.

IMPORTANT REMINDER REGARDING REQUIREMENT FOR OEO CERTIFICATION

A. SECTION 002113 – INSTRUCTIONS TO
BIDDERS: Article 15.0, Section D1:

As of July 1, 2020, all MBE, WBE, and MBE/WBE contractors, subcontractors, and suppliers must be certified by the State of Missouri, Office of Equal Opportunity. No certifications from other Missouri certifying agencies will be accepted.

SECTION 002113 – INSTRUCTIONS TO BIDDERS

1.0 - SPECIAL NOTICE TO BIDDERS

- A. If awarded a contract, the Bidder's employees, and the employees of all subcontractors, who perform the work on the project must adhere to requirements in Section 013513 – Site Security and Health Requirements as applicable per Agency.
- B. The Bidder's prices shall include all city, state, and federal sales, excise, and similar taxes that may lawfully be assessed in connection with the performance of work, and the purchased of materials to be incorporated in the work. THIS PROJECT IS NOT TAX EXEMPT.

2.0 - BID DOCUMENTS

- A. The number of sets obtainable by any one (1) party may be limited in accordance with available supply.
- B. For the convenience of contractors, sub-contractors and suppliers, copies of construction documents are on file at the office of the Director, Division of Facilities Management, Design and Construction and on the Division's web site - <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans>.

3.0 - BIDDERS' OBLIGATIONS

- A. Bidders must carefully examine the entire site of the work and shall make all reasonable and necessary investigations to inform themselves thoroughly as to the facilities available as well as to all the difficulties involved in the completion of all work in accordance with the specifications and the plans. Bidders are also required to examine all maps, plans and data mentioned in the specifications. No plea of ignorance concerning observable existing conditions or difficulties that may be encountered in the execution of the work under this contract will be accepted as an excuse for any failure or omission on the part of the contractor to fulfill in every detail all of the requirements of the contract, nor accepted as a basis for any claims for extra compensation.
- B. Under no circumstances will contractors give their plans and specifications to another contractor. Any bid received from a contractor whose name does not appear on the list of plan holders may be subject to rejection.

4.0 - INTERPRETATIONS

- A. No bidder shall be entitled to rely on oral interpretations as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction. Every request for interpretation shall be made in writing and submitted with all supporting documents not less than five (5) working days before opening of bids. Every interpretation made to a bidder will be in the form of an addendum and will be sent as promptly as is practicable to all persons to whom plans and specifications have been issued. All such addenda shall become part of the contract documents.
- B. Approval for an "acceptable substitution" issued in the form of an addendum as per Paragraph 4A above, and as per Article 3.1 of the General Conditions; ACCEPTABLE SUBSTITUTIONS shall constitute approval for use in the project of the product.
- C. An "acceptable substitution" requested after the award of bid shall be approved if proven to the satisfaction of the Owner and the Designer as per Article 3.1, that the product is acceptable in design, strength, durability, usefulness, and convenience for the purpose intended. Approval of the substitution after award is at the sole discretion of the Owner.
- D. A request for "Acceptable Substitutions" shall be made on the Section 006325 Substitution Request Form. The request shall be sent directly to the project Designer. A copy of said request should also be mailed to the Owner, Division of Facilities Management, Design and Construction, Post Office Box 809, Jefferson City, Missouri 65102.

5.0 - BIDS AND BIDDING PROCEDURE

- A. Bidders shall submit all submission forms and accompanying documents listed in SECTION 004113 – BID FORM, Article 5.0, ATTACHMENTS TO BID by the stated time or their bid will be rejected for being non-responsive.

Depending on the specific project requirements, **the following is a GENERIC list** of all possible bid forms that may be due with bid submittals and times when they may be due. Please check for specific project requirements on the proposal form (Section 004113). ***Not all of the following bid forms may be required to be submitted.***

Bid Submittal – due before stated date and time of bid opening (see IFB):

004113	Bid Form (all pages are always required)
004322	Unit Prices Form
004336	Proposed Subcontractors Form
004337	MBE/WBE/SDVE Compliance Evaluation Form
004338	MBE/WBE/SDVE Eligibility Determination for Joint Ventures
004339	MBE/WBE/SDVE GFE Determination
004340	SDVE Business Form
004541	Affidavit of Work Authorization
004545	Anti-Discrimination Against Israel Act Certification form

- B. All bids shall be submitted without additional terms and conditions, modification or reservation on the bid forms with each space properly filled. Bids not on these forms will be rejected.
- C. All bids shall be accompanied by a bid bond executed by the bidder and a duly authorized surety company, certified check, cashier's check or bank draft made payable to the Division of Facilities Management, Design and Construction, State of Missouri, in the amount indicated on the bid form, Section 004113. Failure of the contractor to submit the full amount required shall be sufficient cause to reject his bid. The bidder agrees that the proceeds of the check, draft or bond shall become the property of the State of Missouri, if for any reason the bidder withdraws his bid after closing, or if on notification of award refuses or is unable to execute tendered contract, provide an acceptable performance and payment bond, provide evidence of required insurance coverage and/or provide required copies of affirmative action plans within ten (10) working days after such tender.
- D. The check or draft submitted by the successful bidder will be returned after the receipt of an acceptable performance and payment bond and execution of the formal contract. Checks or drafts of all other bidders will be returned within a reasonable time after it is determined that the bid represented by same will receive no further consideration by the State of Missouri. Bid bonds will only be returned upon request.

6.0 - SIGNING OF BIDS

- A. A bid from an individual shall be signed as noted on the Bid Form.
- B. A bid from a partnership or joint venture shall require only one signature of a partner, an officer of the joint venture authorized to bind the venture or an attorney-in-fact. If the bid is signed by an officer of a joint venture or an attorney-in-fact, a document evidencing the individual's authority to execute contracts should be included with the bid form.
- C. A bid from a limited liability company (LLC) shall be signed by a manager or a managing member of the LLC.
- D. A bid from a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation manually written. Title of office held by the person signing for the corporation shall appear, along with typed name of said individual. Corporate license number shall be provided and, if a corporation organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached. In addition, for corporate proposals, the President or Vice-President should sign as the bidder. If the signator is other than the corporate president or vice president, the bidder must provide satisfactory evidence that the signator has the legal authority to bind the corporation.

- E. A bid should contain the full and correct legal name of the Bidder. If the Bidder is an entity registered with the Missouri Secretary of State, the Bidder's name on the bid form should appear as shown in the Secretary of State's records.
- F. The Bidder should include its corporate license number on the Bid Form and, if the corporation is organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached to the bid form.

7.0 - RECEIVING BID SUBMITTALS

- A. It is the bidder's sole responsibility to assure receipt by Owner of bid submittals by the date and time specified in the Invitation for Bid. Bids received after the date and time specified shall not be considered by the Owner.
- B. Bids must be submitted through the MissouriBUYS statewide eProcurement system (<https://www.missouribuys.mo.gov/>) in accordance with the instructions for that system. The Owner shall only accept bids submitted through MissouriBUYS. Bids received by the Owner through any other means, including hard copies, shall not be considered and will be discarded by the Owner unopened.
- C. To respond to an Invitation for Bid, the Bidder must first register with MissouriBUYS by going through the MissouriBUYS Home Page (<https://www.missouribuys.mo.gov/>), clicking the "Register" button at the top of the page, and completing the Vendor Registration. Once registered, the Bidder accesses its account by clicking the "Login" button at the top of the MissouriBUYS Home Page. Enter your USERID and PASSWORD, which the Bidder will select. Under Solicitations, select "View Current Solicitations." A new screen will open. Under "Filter by Agency" select "OA-FMDC-Contracts Chapter 8." Under "Filter by Opp. No." type in the State Project Number. Select "Submit." Above the dark blue bar, select "Other Active Opportunities." To see the Solicitation Summary, single click the Opp. No. (Project Number) and the summary will open. Single quick click each blue bar to open detailed information. The Bidder must read and accept the Original Solicitation Documents and complete all identified requirements. The Bidder should download and save all of the Original Solicitation Documents on its computer so that the Bidder can prepare its response to these documents. The Bidder should upload its completed response to the downloaded documents as an attachment to the electronic solicitation response.
- D. Step-by-step instructions for how a registered vendor responds to a solicitation electronically are provided in Section 001116 – Invitation For Bid.
- E. The Bidder shall submit its bid on the forms provided by the Owner on MissouriBUYS with each space fully and properly completed, including all amounts required for alternate bids, unit prices, cost accounting data, etc. The Owner may reject bids that are not on the Owner's forms or that do not contain all requested information.
- F. No Contractor shall stipulate in his bid any conditions not contained in the specifications or standard bid form contained in the contract documents. To do so may subject the Contractor's bid to rejection.
- G. The completed forms shall be without interlineations, alterations or erasures.

8.0 - MODIFICATION AND WITHDRAWAL OF BIDS

- A. Bidder may withdraw his bid at any time prior to scheduled closing time for receipt of bids, but no bidder may withdraw his bid for a period of twenty (20) working days after the scheduled closing time for receipt of bids.
- B. The Bidder shall modify his or her original bid by submitting a revised bid on MissouriBUYS.

9.0 - AWARD OF CONTRACT

- A. The Owner reserves the right to reject any and/or all bids and further to waive all informalities in bidding when deemed in the best interest of the State of Missouri.
- B. The Owner reserves the right to let other contracts in connection with the work, including but not by way of limitation, contracts for the furnishing and installation of furniture, equipment, machines, appliances and other apparatus.

- C. The Owner shall award a contract to the lowest, responsive, responsible Bidder in accordance with Section 8.250, RSMo. No contract will be awarded to any Bidder who has had a contract with the Owner terminated within the preceding twelve months for material breach of contract or who has been suspended or debarred by the Owner.
- D. Award of alternates, if any, will be made in numerical order unless all bids received are such that the order of acceptance of alternates does not affect the determination of the lowest, responsive, responsible bidder.
- E. No bid shall be considered binding upon the Owner until the written contract has been properly executed, a satisfactory bond has been furnished, evidence of required insurance coverage, submittal of executed Section 004541, Affidavit of Work Authorization form, documentation evidencing enrollment and participation in a federal work authorization program has been received and an affirmative action plan submitted. Failure to execute and return the contract and associated documents within the prescribed period of time shall be treated, at the option of the Owner, as a breach of bidder's obligation and the Owner shall be under no further obligation to bidder.
- F. If the successful bidder is doing business in the State of Missouri under a fictitious name, he shall furnish to Owner, attached to the Bid Form, a properly certified copy of the certificate of Registration of Fictitious Name from the State of Missouri, and such certificate shall remain on file with the Owner.
- G. Any successful bidder which is a corporation organized in a state other than Missouri shall furnish to the Owner, attached to the Bid Form, a properly certified copy of its current Certificate of Authority to do business in the State of Missouri, such certificate to remain on file with the Owner. No contract will be awarded by the Owner unless such certificate is furnished by the bidder.
- H. Any successful bidder which is a corporation organized in the State of Missouri shall furnish at its own cost to the Owner, if requested, a Certificate of Good Standing issued by the Secretary of State, such certificate to remain on file with the Owner.
- I. Transient employers subject to Sections 285.230 and 285.234, RSMo, (out-of-state employers who temporarily transact any business in the State of Missouri) may be required to file a bond with the Missouri Department of Revenue. No contract will be awarded by the Owner unless the successful bidder certifies that he has complied with all applicable provisions of Section 285.230-234.
- J. Sections 285.525 and 285.530, RSMo, require business entities to enroll and participate in a federal work authorization program in order to be eligible to receive award of any state contract in excess of \$5,000. Bidders should submit with their bid an Affidavit of Work Authorization (Section 004541) along with appropriate documentation evidencing such enrollment and participation. Section-004541, Affidavit of Work Authorization is located on the MissouriBUYS solicitation for this project. Bidders must also submit an E-Verify Memorandum before the Owner may award a contract to the Bidder. Information regarding an E-Verify is located at <https://www.uscis.gov/e-verify/>. The contractor shall be responsible for ensuring that all subcontractors and suppliers associated with this contract enroll in E-Verify.

10.0 - CONTRACT SECURITY

- A. The successful bidder shall furnish a performance/payment bond as set forth in General Conditions Article 6.1 on a condition prior to the State executing the contract and issuing a notice to proceed.

11.0 - LIST OF SUBCONTRACTORS

- A. If required by "Section 004113 – Bid Form," each bidder must submit as part of their bid a list of subcontractors to be used in performing the work (Section 004336). The list must specify the name of the single designated subcontractor, for each category of work listed in "Section 004336 - Proposed Subcontractors Form." If work within a category will be performed by more than one subcontractor, the bidder must provide the name of each subcontractor and specify the exact portion of the work to be done by each. Failure to list the Bidder's firm, or a subcontractor for each category of work identified on the Bid Form or the listing of more than one subcontractor for any category without designating the portion of work to be performed by each shall be cause for rejection of the bid. If the bidder intends to perform any of the designated subcontract work with the use of his own employees, the bidder shall make that fact clear, by listing his own firm for the subject category. **If any category of work is left vacant, the bid shall be rejected.**

12.0 - WORKING DAYS

- A. Contract duration time is stated in working days and will use the following definition in determining the actual calendar date for contract completion:
 - 1. Working days are defined as all calendar days except Saturdays, Sundays and the following State of Missouri observed holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday, Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day.

13.0 - AMERICAN AND MISSOURI - MADE PRODUCTS AND FIRMS

- A. By signing the bid form and submitting a bid on this project, the Bidder certifies that it will use American and Missouri products as set forth in Article 1.7 of the General Conditions. Bidders are advised to review those requirements carefully prior to bidding.
- B. A preference shall be given to Missouri firms, corporations or individuals, or firms, corporations or individuals that maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less.
- C. Pursuant to Section 34.076, RSMo, a contractor or Bidder domiciled outside the boundaries of the State of Missouri shall be required, in order to be successful, to submit a bid the same percent less than the lowest bid submitted by a responsible contractor or Bidder domiciled in Missouri as would be required for such a Missouri domiciled contractor or Bidder to succeed over the bidding contractor or Bidder domiciled outside Missouri on a like contract or bid being let in the person's domiciliary state and, further, the contractor or Bidder domiciled outside the boundaries of Missouri shall be required to submit an audited financial statement as would be required of a Missouri domiciled contractor or Bidder on a like contract or bid being let in the domiciliary state of that contractor or Bidder.

14.0 – ANTI-DISCRIMINATION AGAINST ISRAEL ACT CERTIFICATION:

- A. Pursuant to section 34.600, RSMo, if the Bidder meets the section 34.600, RSMo, definition of a “company” and the Bidder has ten or more employees, the Bidder must certify in writing that the Bidder is not currently engaged in a boycott of goods or services from the State of Israel as defined in section 34.600, RSMo, and shall not engage in a boycott of goods or services from the State of Israel, if awarded a contract, for the duration of the contract. The Bidder is requested to complete and submit the applicable portion of Section 004545 - Anti-Discrimination Against Israel Act Certification with their Bid Form. The applicable portion of the exhibit must be submitted prior to execution of a contract by the Owner and issuance of Notice to Proceed. If the exhibit is not submitted, the Owner shall rescind its Intent to Award and move to the next lowest, responsive, responsible bidder.

15.0 - MBE/WBE/SDVE INSTRUCTIONS

- A. Definitions:
 - 1. “**MBE**” means a Minority Business Enterprise.
 - 2. “**MINORITY**” has the same meaning as set forth in 1 C.S.R. 10-17.010.
 - 3. “**MINORITY BUSINESS ENTERPRISE**” has the same meaning as set forth in section 37.020, RSMo.
 - 4. “**WBE**” means a Women’s Business Enterprise.
 - 5. “**WOMEN’S BUSINESS ENTERPRISE**” has the same meaning as set forth in section 37.020, RSMo.
 - 6. “**SDVE**” means a Service-Disabled Veterans Enterprise.
 - 7. “**SERVICE-DISABLED VETERAN**” has the same meaning as set forth in section 34.074, RSMo.
 - 8. “**SERVICE-DISABLED VETERAN ENTERPRISE**” has the same meaning as “Service-Disabled Veteran Business” set forth in section 34.074, RSMo.

B. MBE/WBE/SDVE General Requirements:

1. For all bids greater than \$100,000, the Bidder shall obtain MBE, WBE and SDVE participation in an amount equal to or greater than the percentage goals set forth in the Invitation for Bid and the Bid Form, unless the Bidder is granted a Good Faith Effort waiver by the Director of the Division, as set forth below. If the Bidder does not meet the MBE, WBE and SDVE goals, or make a good faith effort to do so, the Bidder shall be non-responsive, and its bid shall be rejected.
2. The Bidder should submit with its bid all of the information requested in the MBE/WBE/SDVE Compliance Evaluation Form for every MBE, WBE, or SDVE subcontractor or material supplier the Bidder intends to use for the contract work. The Bidder is required to submit all appropriate MBE/WBE/SDVE documentation before the stated time and date set forth in the Invitation for Bid. If the Bidder fails to provide such information by the specified date and time, the Owner shall reject the bid.
3. The Director reserves the right to request additional information from a Bidder to clarify the Bidder's proposed MBE, WBE, and/or SDVE participation. The Bidder shall submit the clarifying information requested by the Owner within two (2) Working Days of receiving the request for clarification.
4. Pursuant to section 34.074, RSMo, a Bidder that is a SDVE doing business as Missouri firm, corporation, or individual, or that maintains a Missouri office or place of business, shall receive a three-point bonus preference in the contract award evaluation process. The bonus preference will be calculated and applied by reducing the bid amount of the eligible SDVE by three percent of the apparent low responsive bidder's bid. Based on this calculation, if the eligible SDVE's evaluation is less than the apparent low responsive bidder's bid, the eligible SDVE's bid becomes the apparent low responsive bid. This reduction is for evaluation purposes only, and will have no impact on the actual amount(s) of the bid or the amount(s) of any contract awarded. In order to be eligible for the SDVE preference, the Bidder must complete and submit with its bid the Missouri Service Disabled Veteran Business Form, and any information required by the form. The form is available on the MissouriBUYS solicitation for this project.

C. Computation of MBE/WBE/SDVE Goal Participation:

1. A Bidder who is a MBE, WBE, or SDVE may count 100% of the contract towards the MBE, WBE or SDVE goal, less any amounts awarded to another MBE, WBE or SDVE. (NOTE: A MBE firm that bids as general contractor must obtain WBE and SDVE participation; a WBE firm that bids as a general contractor must obtain MBE and SDVE participation; and a SDVE firm that bids as general contractor must obtain MBE and WBE participation.) In order for the remaining contract amount to be counted towards the MBE, WBE or SDVE goal, the Bidder must complete the MBE/WBE/SDVE Compliance Evaluation Form (Section 004337) identifying itself as an MBE, WBE or SDVE.
2. The total dollar value of the work granted to a certified MBE, WBE or SDVE by the Bidder shall be counted towards the applicable goal.
3. Expenditures for materials and supplies obtained from a certified MBE, WBE, or SDVE supplier or manufacturer may be counted towards the MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE assumes the actual and contractual responsibility for the provision of the materials and supplies.
4. The total dollar value of the work granted to a second or subsequent tier subcontractor or a supplier may be counted towards a Bidder's MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE properly assumes the actual and contractual responsibility for the work.
5. The total dollar value of work granted to a certified joint venture equal to the percentage of the ownership and control of the MBE, WBE, or SDVE partner in the joint venture may be counted towards the MBE/WBE/SDVE goals.
6. Only expenditures to a MBE, WBE, or SDVE that performs a commercially useful function in the work may be counted towards the MBE, WBE and SDVE goals. A MBE, WBE, or SDVE performs a commercially useful function when it is responsible for executing a distinct element of the work and carrying out its responsibilities by actually performing, managing and supervising the work or providing supplies or manufactured materials.

D. Certification of MBE/WBE/SDVE Subcontractors:

1. In order to be counted towards the goals, an MBE or WBE must be certified by the State of Missouri Office of Equal Opportunity and an SDVE must be certified by the State of Missouri, Office of Administration, Division of Purchasing and Material Management or by the Department of Veterans Affairs.
2. The Bidder may determine the certification status of a proposed MBE or WBE subcontractor or supplier by referring to the Office of Equal Opportunity (OEO)'s online MBE/WBE directory (<https://apps1.mo.gov/MWBCertifiedFirms/>). The Bidder may determine the eligibility of a SDVE subcontractor or supplier by referring to the Division of Purchasing and Materials Management's online SDVE directory (<https://oa.mo.gov/sites/default/files/sdvelisting.pdf>) or the Department of Veterans Affairs' directory (<https://vetbiz.va.gov/basic-search/>).
3. Additional information, clarifications, etc., regarding the listings in the directories may be obtained by calling the Division at (573)751-3339 and asking to speak to the Contract Specialist of record as shown in the Supplementary Conditions (Section 007300).

E. Waiver of MBE/WBE/SDVE Participation:

1. If a Bidder has made a good faith effort to secure the required MBE, WBE and/or SDVE participation and has failed, the Bidder shall submit with its bid the information requested in MBE/WBE/SDVE Good Faith Effort (GFE) Determination form. The GFE forms are located on the MissouriBUYS solicitation for this project. The Director will determine if the Bidder made a good faith effort to meet the applicable goals. If the Director determines that the Bidder did not make a good faith effort, the bid shall be rejected as being nonresponsive to the bid requirements. Bidders who demonstrate that they have made a good faith effort to include MBE, WBE, and/or SDVE participation will be determined to be responsive to the applicable participation goals, regardless of the percent of actual participation obtained, if the bid is otherwise acceptable.
2. In determining whether a Bidder has made a good faith effort to obtain MBE, WBE and/or SDVE participation, the Director may evaluate the factors set forth in 1 CSR 30-5.010(6)(C) and the following:
 - a. The amount of actual participation obtained;
 - b. How and when the Bidder contacted potential MBE, WBE, and SDVE subcontractors and suppliers;
 - c. The documentation provided by the Bidder to support its contacts, including whether the Bidder provided the names, addresses, phone numbers, and dates of contact for MBE/WBE/SDVE firms contacted for specific categories of work;
 - d. If project information, including plans and specifications, were provided to MBE/WBE/SDVE subcontractors;
 - e. Whether the Bidder made any attempts to follow-up with MBE, WBE or SDVE firms prior to bid;
 - f. Amount of bids received from any of the subcontractors and/or suppliers that the Bidder contacted;
 - g. The Bidder's stated reasons for rejecting any bids;
3. If no bidder has obtained any participation in a particular category (MBE/WBE/SDVE) or made a good faith effort to do so, the Director may waive that goal rather than rebid.

F. Contractor MBE/WBE/SDVE Obligations

1. If awarded a contract, the Bidder will be contractually required to subcontract with or obtain materials from the MBE, WBE, and SDVE firms listed in its bid, in amounts equal to or greater than the dollar amount bid, unless the amount is modified in writing by the Owner.
2. If the Contractor fails to meet or maintain the participation requirements contained in the Contractor's bid, the Contractor must satisfactorily explain to the Director why it cannot comply with the requirement and why failing meeting the requirement was beyond the Contractor's control. If the Director finds the Contractor's explanation unsatisfactory, the Director may take any appropriate action including, but not limited to:
 - a. Declaring the Contractor ineligible to participate in any contracts with the Division for up to twelve (12) months (suspension); and/or
 - b. Declaring the Contractor be non-responsive to the Invitation for Bid, or in breach of contract and rejecting the bid or terminating the contract.
3. If the Contractor replaces an MBE, WBE, or SDVE during the course of this contract, the Contractor shall replace it with another MBE, WBE, or SDVE or make a good faith effort to do so. All MBE, WBE and SDVE substitutions must be approved by the Director.
4. The Contractor shall provide the Owner with regular reports on its progress in meeting its MBE/WBE/SDVE obligations. At a minimum, the Contractor shall report the dollar-value of work completed by each MBE, WBE, or SDVE during the preceding month and the cumulative total of work completed by each MBE, WBE or SDVE to date with each monthly application for payment. The Contractor shall also make a final report, which shall include the total dollar-value of work completed by each MBE, WBE, and SDVE during the entire contract.

**STATE OF MISSOURI
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION
*MBE/WBE/SDVE DIRECTORIES***

The MBE/WBE Directory for goods and services is maintained by the Office of Equal Opportunity (OEO) and is located at the following web address:

<https://apps1.mo.gov/MWBCertifiedFirms/>

The SERVICE DISABLED VETERAN ENTERPRISE (SDVE) Directories may be accessed at the following web addresses:

<https://o eo .mo .gov /sdve -certification -program />

<https://veterans.certify.sba.gov/#search>



State of Missouri Construction Contract

THIS AGREEMENT is made (DATE) by and between:

Contractor Name and Address

hereinafter called the "Contractor,"

and the **State of Missouri**, hereinafter called the "**Owner**", represented by the Office of Administration, Division of Facilities Management, Design and Construction.

WITNESSETH, that the Contractor and the Owner, for the consideration stated herein agree as follows:

ARTICLE 1. STATEMENT OF WORK

The Contractor shall furnish all labor and materials and perform all work required for furnishing and installing all labor, materials, equipment and transportation and everything necessarily inferred from the general nature and tendency of the plans and specifications for the proper execution of the work for:

Project Name: **Renovate Mechanical/Electrical/Life Safety
Jefferson State Office Building
Jefferson City, Missouri**

Project Number: **O1911-01**

in strict accordance with the Contract Documents as enumerated in Article 7, all of which are made a part hereof.

ARTICLE 2. TIME OF COMPLETION

The contract performance time is **1,055 working days** from the transmittal date of this agreement. The contract completion date is **MONTH, DAY, YEAR**. This time includes ten (10) working days for the Contractor to receive, sign and return the contract form along with required bonding and insurance certificates. Failure of the Contractor to provide correct bonding and insurance within the ten (10) working days shall not be grounds for a time extension. Receipt of proper bonding and insurance is a condition precedent to the formation of the contract and if not timely received, may result in forfeiture of the Contractor's bid security. Work may not commence until the Owner issues a written Notice to Proceed and must commence within seven (7) working days thereafter.

ARTICLE 3. LIQUIDATED DAMAGES

Whenever time is mentioned in this contract, time shall be and is of the essence of this contract. The Owner would suffer a loss should the Contractor fail to have the work embraced in this contract fully completed on or before the time above specified. THEREFORE, the parties hereto realize in order to adjust satisfactorily the damages on account of such failure that it might be impossible to compute accurately or estimate the amount of such loss or damages which the Owner would sustain by reason of failure to complete fully said work within the time required by this contract. The Contractor hereby covenants and agrees to pay the Owner, as and for **liquidated damages, the sum of \$2,000** per day for each and every day, Sunday and legal holidays excepted, during which the work remains incomplete and unfinished. Any sum which may be due the Owner for such damages shall be deducted and retained by the Owner from any balance which may be due the Contractor when said work shall have been finished and accepted. But such provisions shall not release the Bond of the Contractor from liability according to its terms. In case of failure to complete, the Owner will be under no obligation to show or prove any actual or specific loss or damage.

ARTICLE 4. CONTRACT SUM

The Owner shall pay the Contractor for the prompt, faithful and efficient performance of the conditions and undertakings of this contract, subject to additions, and deductions as provided herein, in current funds the sum of:

Base Bid:	\$
Alternate No. 1:	\$
Alternate No. 2:	\$
Alternate No. 3:	\$
Alternate No. 4:	\$
Alternate No. 5:	\$
Alternate No. 6:	\$
Alternate No. 7:	\$

TOTAL CONTRACT AMOUNT: (\$CONTRACT AMOUNT)

ARTICLE 5. PREVAILING WAGE RATE

MISSOURI PREVAILING WAGE LAW (Sections 290.210 to 290.340, RSMo): The Contractor shall pay not less than the specified hourly rate of wages, as set out in the wage order attached to and made part of the specifications for work under this contract, to all workers performing work under the contract, in accordance with sections 290.210 to 290.340, RSMo. The Contractor shall forfeit a penalty to the Owner of one hundred dollars per day (or portion of a day) for each worker that is paid less than the specified rates for any work done under the contract by the Contractor or by any subcontractor, in accordance with section 290.250, RSMo.

DAVIS-BACON ACT: If this Project is financed in whole or in part from Federal funds (as indicated in the Instructions to Bidders or other bid or contract documents for this Project), then this contract shall be subject to all applicable federal labor statutes, rules and regulations, including provisions of the Davis-Bacon Act, 40 U.S.C. §3141 et seq., and the “Federal Labor Standards Provisions,” as further set forth in Section 007333 – Supplementary General Conditions for Federally Funded/Assisted Construction Projects, which is incorporated into the contract by reference. Where the Missouri Prevailing Wage Law and the Davis-Bacon Act require payment of different wages for work performed under this contract, the Contractor and all Subcontractors shall pay the greater of the wages required under either law, on a classification by classification basis.

ARTICLE 6. MINORITY/WOMEN/SERVICE DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION

The Contractor has been granted a waiver of the 10% MBE and 10% WBE and 3% SDVE participation goals. The Contractor agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows: (OR)

The Contractor has met the MBE/WBE/SDVE participation goals and agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows:

MBE/WBE/SDVE Firm:	Subcontract Amt:\$	
MBE/WBE/SDVE Firm:	Subcontract Amt:\$	
MBE/WBE/SDVE Firm:	Subcontract Amt:\$	
		Total \$

MBE/WBE/SDVE assignments identified above shall not be changed without a contract change signed by the Owner.

The Director of the Division of Facilities Management, Design and Construction or his Designee shall be the final authority to resolve disputes and disagreements between the Contractor and the MBE/WBE/SDVE firms listed above when such disputes impact the subcontract amounts shown above.

ARTICLE 7. CONTRACT DOCUMENTS

The following documents are hereby incorporated into this contract by reference (all division/section numbers and titles are as utilized in the Project Manual published by the Owner for this Project):

- 1. Division 0 – Procurement and Contracting Information, including, but not limited to:
 - a. Invitation for Bid (Section 001116)
 - b. Instructions to Bidders (Section 002113)
 - c. Supplementary Instructions to Bidders (if applicable) (Section 002213)
 - d. The following documents as completed and executed by the Contractor and accepted by the Owner, if applicable:
 - i. Bid Form (Section 004113)
 - ii. Proposed Contractors Form (Section 004336)
 - iii. MBE, WBE, SDVE Compliance Evaluation Form(s) (Section 004337)
 - iv. MBE, WBE, SDVE Eligibility Determination Form for Joint Ventures (Section 004338)
 - v. MBE, WBE, SDVE Good Faith Effort (GFE) Determination Form (Section 004339)
 - vi. Missouri Service Disabled Veteran Business Form (Section 004340)
 - vii. Affidavit of Work Authorization (Section 004541)
 - viii. Affidavit for Affirmative Action (Section 005414)
 - e. Performance and Payment Bond, completed and executed by the Contractor and surety (Section 006113)
 - f. General Conditions (Section 007213)
 - g. Supplementary Conditions (Section 007300)
 - h. Supplementary General Conditions for Federally Funded/Assisted Construction Projects (Section 007333)
 - i. Wage Rate(s) (Section 007346)
- 2. Division 1 – General Requirements
- 3. All Drawings identified in the Project Manual
- 4. All Technical Specifications included in the Project Manual
- 5. Addenda, if applicable

ARTICLE 8 – CERTIFICATION

By signing this contract, the Contractor hereby re-certifies compliance with all legal requirements set forth in Section 6.0, Bidder’s Certifications of the Bid Form.

Further, if the Contractor provides any “personal information” as defined in §105.1500, RSMo concerning an entity exempt from federal income tax under Section 501(c) of the Internal Revenue Code of 1986, as amended, the Contractor understands and agrees that it is voluntarily choosing to enter into a state contract and providing such information for that purpose. The state will treat such personal information in accord with §105.1500, RSMo.

By signature below, the parties hereby execute this contract document.

APPROVED:

Brian Yansen, Director
Division of Facilities Management,
Design and Construction

Contractor’s Authorized Signature

I, Corporate Secretary, certify that I am Secretary of the corporation named above and that (CONTRACTOR NAME), who signed said contract on behalf of the corporation, was then (TITLE) of said corporation and that said contract was duly signed for and in behalf of the corporation by authority of its governing body, and is within the scope of its corporate powers.

Corporate Secretary



STATE OF MISSOURI
 OFFICE OF ADMINISTRATION
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION
AFFIDAVIT FOR AFFIRMATIVE ACTION

PROJECT NUMBER

NAME

First being duly sworn on oath states: that

he/she is the sole proprietor partner officer or manager or managing member of

NAME

a sole proprietorship partnership
 limited liability company (LLC)

or corporation, and as such, said proprietor, partner, or officer is duly authorized to make this

affidavit on behalf of said sole proprietorship, partnership, or corporation; that under the contract known as

PROJECT TITLE

Less than 50 persons in the aggregate will be employed and therefore, the applicable Affirmative Action requirements as set forth in Article 1.4 of the General Conditions of the State of Missouri have been met.

PRINT NAME & SIGNATURE

DATE

--

NOTARY INFORMATION

NOTARY PUBLIC EMBOSSER SEAL	STATE OF	COUNTY (OR CITY OF ST. LOUIS)	USE RUBBER STAMP IN CLEAR AREA BELOW
	SUBSCRIBED AND SWORN BEFORE ME, THIS		
	DAY OF	YEAR	
	NOTARY PUBLIC SIGNATURE	MY COMMISSION EXPIRES	
NOTARY PUBLIC NAME (TYPED OR PRINTED)			

SECTION 006113 - PERFORMANCE AND PAYMENT BOND FORM

KNOW ALL MEN BY THESE PRESENTS, THAT we _____

as principal, and _____

_____ as Surety, are held and firmly bound unto the

STATE OF MISSOURI. in the sum of _____ Dollars (\$ _____)

for payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal has, by means of a written agreement dated the _____

day of _____, 20_____, enter into a contract with the State of Missouri for

(Insert Project Title and Number)

NOW, THEREFORE, if the Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the State of Missouri, with or without notice to the Surety and during the life of any guaranty required under the contract; and shall also faithfully perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made with or without notice to the Surety; and shall also promptly make payment for materials incorporated, consumed or used in connection with the work set forth in the contract referred to above, and all insurance premiums, both compensation and all other kinds of insurance, on said work, and for all labor performed on such work, whether by subcontractor or otherwise, at not less than the prevailing hourly rate of wages for work of a similar character (exclusive of maintenance work) in the locality in which the work is performed and not less than the prevailing hourly rate of wages for legal holiday and overtime work (exclusive of maintenance work) in the locality in which the work is performed both as determined by the Department of Labor and Industrial Relations or determined by the Court of Appeal, as provided for in said contract and in any and all duly authorized modifications of said contract that may be hereafter made, with or without notice to the Surety, then, this obligation shall be void and of no effect, but it is expressly understood that if the Principal should make default in or should fail to strictly, faithfully and efficiently do, perform and comply with any or more of the covenants, agreements, stipulations, conditions, requirements or undertakings, as specified in or by the terms of said contract, and with the time therein named, then this obligation shall be valid and binding upon each of the parties hereto and this bond shall remain in full force and effect; and the same may be sued on at the instance of any material man, laborer, mechanic, subcontractor, individual, or otherwise to whom such payment is due, in the name of the State of Missouri, to the use of any such person.

AND, IT IS FURTHER specifically provided that any modifications which may hereinafter be made in the terms of the contract or in the work to be done under it or the giving by the Owner of any extension of the time for the performance of the contract or any other forbearance on the part of either the Owner or the Principal to the other, shall not in any way release the Principal and the Surety, or either or any of them, their heirs, executors, administrators and successors, from their liability hereunder, notice to the Surety of any such extension, modifications or forbearance being hereby waived.

IN WITNESS WHEREOF, the above bounden parties have executed the within instrument this _____ day of _____, 20 ____.

AS APPLICABLE:

AN INDIVIDUAL

Name: _____

Signature: _____

A PARTNERSHIP

Name of Partner: _____

Signature of Partner: _____

Name of Partner: _____

Signature of Partner: _____

CORPORATION

Firm Name: _____

Signature of President: _____

SURETY

Surety Name: _____

Attorney-in-Fact: _____

Address of Attorney-in-Fact: _____

Telephone Number of Attorney-in-Fact: _____

Signature Attorney-in-Fact: _____

NOTE: Surety shall attach Power of Attorney



STATE OF MISSOURI
 OFFICE OF ADMINISTRATION
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION
PRODUCT SUBSTITUTION REQUEST

PROJECT NUMBER

PROJECT TITLE AND LOCATION

CHECK APPROPRIATE BOX

- SUBSTITUTION PRIOR TO BID OPENING**
 (Minimum of (5) working days prior to receipt of Bids as per Article 4 – Instructions to Bidders)
- SUBSTITUTION FOLLOWING AWARD**
 (Maximum of (20) working days from Notice to Proceed as per Article 3 – General Conditions)

FROM: BIDDER/CONTRACTOR (PRINT COMPANY NAME)

TO: ARCHITECT/ENGINEER (PRINT COMPANY NAME)

Bidder/Contractor hereby requests acceptance of the following product or systems as a substitution in accordance with provisions of Division One of the Bidding Documents:

SPECIFIED PRODUCT OR SYSTEM

SPECIFICATION SECTION NO.

SUPPORTING DATA

- Product data for proposed substitution is attached (include description of product, standards, performance, and test data)
- Sample Sample will be sent, if requested

QUALITY COMPARISON

	SPECIFIED PRODUCT	SUBSTITUTION REQUEST
NAME, BRAND		
CATALOG NO.		
MANUFACTURER		
VENDOR		

PREVIOUS INSTALLATIONS

PROJECT	ARCHITECT/ENGINEER	DATE INSTALLED
LOCATION		

SIGNIFICANT VARIATIONS FROM SPECIFIED PRODUCT

REASON FOR SUBSTITUTION
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

DOES PROPOSED SUBSTITUTION AFFECT OTHER PARTS OF WORK?
<input type="checkbox"/> YES <input type="checkbox"/> NO
IF YES, EXPLAIN _____ <hr/> <hr/> <hr/> <hr/>

SUBSTITUTION REQUIRES DIMENSIONAL REVISION OR REDESIGN OF STRUCTURE OR A/E WORK
<input type="checkbox"/> YES <input type="checkbox"/> NO

<p>BIDDER’S/CONTRACTOR’S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:</p> <p>We have investigated the proposed substitution. We believe that it is equal or superior in all respects to specified product, except as stated above; that it will provide the same Warranty as specified product; that we have included complete implications of the substitution; that we will pay redesign and other costs caused by the substitution which subsequently become apparent; and that we will pay costs to modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning as a result of the substitution.</p>

BIDDER/CONTRACTOR	DATE
-------------------	------

REVIEW AND ACTION
<input type="checkbox"/> Resubmit Substitution Request with the following additional information: <hr/>
<input type="checkbox"/> Substitution is accepted.
<input type="checkbox"/> Substitution is accepted with the following comments: <hr/>
<input type="checkbox"/> Substitution is not accepted.

ARCHITECT/ENGINEER	DATE
--------------------	------



STATE OF MISSOURI
 OFFICE OF ADMINISTRATION
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION
FINAL RECEIPT OF PAYMENT AND RELEASE

PROJECT NUMBER

KNOW ALL MEN BY THESE PRESENT THAT: hereinafter called "Subcontractor" who heretofore entered into an agreement with hereinafter called "Contractor", for the performance of work and/or furnishing of material for the construction of the project entitled

(PROJECT TITLE, PROJECT LOCATION, AND PROJECT NUMBER)

at

 (ADDRESS OF PROJECT)

for the State of Missouri (Owner) which said subcontract is by this reference incorporated herein, in consideration of such final payment by Contractor.

DOES HEREBY:

1. ACKNOWLEDGE that they have been **PAID IN FULL** all sums due for work and materials contracted or done by their Subcontractors, Material Vendors, Equipment and Fixture Suppliers, Agents and Employees, or otherwise in the performance of the Work called for by the aforesaid Contract and all modifications or extras or additions thereto, for the construction of said project or otherwise.
2. RELEASE and fully, finally, and forever discharge the Owner from any and all suits, actions, claims, and demands for payment for work performed or materials supplied by Subcontractor in accordance with the requirements of the above referenced Contract.
1. REPRESENT that all of their Employees, Subcontractors, Material Vendors, Equipment and Fixture Suppliers, and everyone else has been **paid in full** all sums due them, or any of them, in connection with performance of said Work, or anything done or omitted by them, or any of them in connection with the construction of said improvements, or otherwise.

DATED this day of , 20 .

NAME OF SUBCONTRACTOR

BY (TYPED OR PRINTED NAME)

SIGNATURE

TITLE

ORIGINAL: FILE/Closeout Documents



STATE OF MISSOURI
 OFFICE OF ADMINISTRATION
 DIVISION OF FACILITIES MANAGEMENT,
 DESIGN AND CONSTRUCTION

MBE/WBE/SDVE PROGRESS REPORT

Remit with ALL Progress and Final Payments

(Please check appropriate box) CONSULTANT CONSTRUCTION

PAY APP NO.	PROJECT NUMBER
CHECK IF FINAL <input checked="" type="checkbox"/> FINAL	DATE

PROJECT TITLE

PROJECT LOCATION

FIRM

ORIGINAL CONTRACT SUM (Same as Line Item 1. on Form A of Application for Payment)
\$

TOTAL CONTRACT SUM TO DATE (Same as Line Item 3. on Form A of Application for Payment)
\$

THE TOTAL MBE/WBE/SDVE PARTICIPATION DOLLAR AMOUNT OF THIS PROJECT AS INDICATED IN THE ORIGINAL CONTRACT: \$

SELECT MBE, WBE, SDVE	ORIGINAL CONTRACT PARTICIPATION AMOUNT	PARTICIPATION AMOUNT PAID-TO-DATE (includes approved contract changes)	CONSULTANT/SUBCONSULTANT OR CONTRACTOR/SUBCONTRACTOR/SUPPLIER COMPANY NAME
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	



STATE OF MISSOURI
 OFFICE OF ADMINISTRATION
 DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION
AFFIDAVIT – COMPLIANCE WITH PREVAILING WAGE LAW

PROJECT NUMBER

Before me, the undersigned Notary Public, in and for the County of _____

State of _____ personally came and appeared _____

(NAME)

of the _____

(POSITION)

(NAME OF THE COMPANY)

(a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions and requirements set out in Chapter 290, Sections 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works project have been fully satisfied and there has been no exception to the full and completed compliance with said provisions and requirements

and with Wage Determination No: _____ issued by the

Department of Labor and Industrial Relations, State of Missouri on the _____ day of _____ 20__

in carrying out the contract and working in connection with _____

(NAME OF PROJECT)

Located at _____ in _____ County

(NAME OF THE INSTITUTION)

Missouri, and completed on the _____ day of _____ 20__

SIGNATURE

NOTARY INFORMATION

NOTARY PUBLIC EMBOSSEY OR BLACK INK RUBBER STAMP SEAL

STATE

COUNTY (OR CITY OF ST. LOUIS)

SUBSCRIBED AND SWORN BEFORE ME, THIS

DAY OF

YEAR

USE RUBBER STAMP IN CLEAR AREA BELOW

NOTARY PUBLIC SIGNATURE

MY COMMISSION EXPIRES

NOTARY PUBLIC NAME (TYPED OR PRINTED)

GENERAL CONDITIONS

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ARTICLE:

1. General Provisions

- 1.1. Definitions
- 1.2. Drawings and Specifications
- 1.3. Compliance with Laws, Permits, Regulations and Inspections
- 1.4. Nondiscrimination in Employment
- 1.5. Anti-Kickback
- 1.6. Patents and Royalties
- 1.7. Preference for American and Missouri Products and Services
- 1.8. Communications
- 1.9. Separate Contracts and Cooperation
- 1.10. Assignment of Contract
- 1.11. Indemnification
- 1.12. Disputes and Disagreements

2. Owner/Designer Responsibilities

3. Contractor Responsibilities

- 3.1. Acceptable Substitutions
- 3.2. Submittals
- 3.3. As-Built Drawings
- 3.4. Guaranty and Warranties
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- 6.1. Bond
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SECTION 007213 - GENERAL CONDITIONS

- A. These General Conditions apply to each section of these specifications. The Contractor is subject to the provisions contained herein.
- B. The General Conditions are intended to define the relationship of the Owner, the Designer and the Contractor thereby establishing certain rules and provisions governing the operation and performance of the work so that the work may be performed in a safe, orderly, expeditious and workmanlike manner.

ARTICLE 1 – GENERAL PROVISIONS

ARTICLE 1.1 - DEFINITIONS

As used in these contract documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

1. **"COMMISSIONER"**: The Commissioner of the Office of Administration.
2. **"CONSTRUCTION DOCUMENTS"**: The "Construction Documents" shall consist of the Project Manual, Drawings and Addenda.
3. **"CONSTRUCTION REPRESENTATIVE"**: Whenever the term "Construction Representative" is used, it shall mean the Owner's Representative at the work site.
4. **"CONTRACTOR"**: Party or parties who have entered into a contract with the Owner to furnish work under these specifications and drawings.
5. **"DESIGNER"**: When the term "Designer" is used herein, it shall refer to the Architect, Engineer, or Consultant of Record specified and defined in Paragraph 2.0 of the Supplemental Conditions, or his duly authorized representative. The Designer may be either a consultant or state employee.
6. **"DIRECTOR"**: Whenever the term "Director" is used, it shall mean the Director of the Division of Facilities Management, Design and Construction or his Designee, representing the Office of Administration, State of Missouri. The Director is the agent of the Owner.
7. **"DIVISION"**: Shall mean the Division of Facilities Management, Design and Construction, State of Missouri.

8. **"INCIDENTAL JOB BURDENS"**: Shall mean those expenses relating to the cost of work, incurred either in the home office or on the job-site, which are necessary in the course of doing business but are incidental to the job. Such costs include office supplies and equipment, postage, courier services, telephone expenses including long distance, water and ice and other similar expenses.
9. **"JOINT VENTURE"**: An association of two (2) or more businesses to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge.
10. **"OWNER"**: Whenever the term "Owner" is used, it shall mean the State of Missouri, acting by and through the Office of Administration, Division of Facilities Management, Design and Construction.
11. **"PROJECT"**: Wherever the term "Project" is used, it shall mean the work required to be completed by the construction contract.
12. **"PROJECT MANUAL"**: The "Project Manual" shall consist of Introductory Information, Invitation for Bid, Instructions to Bidders, Bid Documents, Additional Information, Standard Forms, General Conditions, Supplemental General Conditions, General Requirements and Technical Specifications.
13. **"SUBCONTRACTOR"**: Party or parties who contract under, or for the performance of part or this entire Contract between the Owner and Contractor. The subcontract may or may not be direct with the Contractor.
14. **"WORK"**: All supervision, labor, materials, tool, supplies, equipment, and any incidental operations and/or activities required by or reasonably inferable from the Contract Documents necessary to construct the Project and to produce the results intended by the Contract Documents in a safe, expeditious, orderly, and workmanlike manner, and in the best manner known to each respective trade.
15. **"WORKING DAYS"**: are all calendar days except Saturdays, Sundays and the following holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday (observed), Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day (observed), Thanksgiving Day, Christmas Day.

ARTICLE 1.2 DRAWINGS AND SPECIFICATIONS

- A. In case of discrepancy between drawings and specifications, specifications shall govern. Should discrepancies in architectural drawings, structural drawings and mechanical drawings occur, architectural drawings shall govern and, in case of conflict between structural and mechanical drawings, structural drawings shall govern.
- B. Specifications are separated into titled divisions for convenience of reference only and to facilitate letting of contracts and subcontracts. The Contractor is responsible for establishing the scope of work for subcontractors, which may cross titled divisions. Neither the Owner nor Designer will establish limits and jurisdiction of subcontracts.
- C. Figured dimensions take precedence over scaled measurements and details over smaller scale general drawings. In the event of conflict between any of the documents contained within the contract, the documents shall take precedence and be controlling in the following sequence: addenda, supplementary general conditions, general conditions, division 1 specifications, technical division specifications, drawings, bid form and instructions to bidders.
- D. Anything shown on drawings and not mentioned in these specifications or vice versa, as well as any incidental work which is obviously necessary to complete the project within the limits established by the drawings and specifications, although not shown on or described therein, shall be performed by the Contractor at no additional cost as a part of his contract.
- E. Upon encountering conditions differing materially from those indicated in the contract documents, the Contractor shall promptly notify the Designer and Construction Representative in writing before such conditions are disturbed. The Designer shall promptly investigate said conditions and report to the Owner, with a recommended course of action. If conditions do materially differ and cause an increase or decrease in contract cost or time required for completion of any portion of the work, a contract change will be initiated as outlined in Article 4 of these General Conditions.
- E. Only work included in the contract documents is authorized, and the Contractor shall do no work other than that described therein or in accordance with appropriately authorized and approved contract changes.

ARTICLE 1.3 - COMPLIANCE WITH LAWS, PERMITS, REGULATIONS AND INSPECTIONS

- A. Since the Owner is the State of Missouri, municipal or political subdivisions, zoning ordinances, construction codes (other than licensing of trades), and other like ordinances are not applicable to construction on Owner's property, and Contractor will not be required to submit drawings and specifications to any municipal or political subdivision, authority, obtain construction permits or any other licenses (other than licensing of trades) or permits from or submit to inspections by any municipality or political subdivision relating to the construction for this project. All permits or licenses required by municipality or political subdivision for operation on property not belonging to Owner shall be obtained by and paid for by Contractor. Each Contractor shall comply with all applicable laws, ordinances, rules and regulations that pertain to the work of this contract.
- B. Contractors, subcontractors and their employees engaged in the businesses of electrical, mechanical, plumbing, carpentry, sprinkler system work, and other construction related trades shall be licensed to perform such work by the municipal or political subdivision where the project is located, if such licensure is required by local code. Local codes shall dictate the level (master, journeyman, and apprentice) and the number, type and ratio of licensed tradesmen required for this project within the jurisdiction of such municipal or political subdivision.
- C. Equipment and controls manufacturers and their authorized service and installation technicians that do not maintain an office within the jurisdiction of the municipal or political subdivision but are a listed or specified contractor or subcontractor on this project are exempt from Paragraph 1.3 B above.
- D. The Contractor shall post a copy of the wage determination issued for the project and included as a part of the contract documents, in a prominent and easily accessible location at the site of construction for the duration of the project.
- E. Any contractor or subcontractor to such contractor at any tier signing a contract to work on this project shall provide a ten-hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The contractor shall

forfeit as a penalty to the public body on whose behalf the contract is made or awarded, two thousand five hundred dollars plus one hundred dollars for each employee employed by the contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training.

ARTICLE 1.4 - NONDISCRIMINATION IN EMPLOYMENT

A. The Contractor and his subcontractors will not discriminate against individuals based on race, color, religion, national origin, sex, disability, or age, but may use restrictions which relate to bona fide occupational qualifications. Specifically, the Contractor and his subcontractors shall not discriminate:

1. Against recipients of service on the basis of race, color, religion, national origin, sex, disability or age.
2. Against any employee or applicant, for employment on the basis of race, color, religion, national origin, sex or otherwise qualified disability status.
3. Against any applicant for employment or employee on the basis of age, where such applicant or employee is between ages 40 and 70 and where such Contractor employs at least 20 persons.
4. Against any applicant for employment or employee on the basis of that person's status as a disabled or Vietnam-era veteran.

The Contractor and his Subcontractors will take affirmative action to insure applicants for employment and employees are treated equally without regard to race, color, religion, national origin, sex, disability, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion and transfer; recruitment or recruitment advertising; and selection for training, including apprenticeship. The Contractor and his Subcontractors will give written notice of their commitments under this clause to any labor union with which they have bargaining or other agreements.

B. The Contractor and his subcontractors shall develop, implement, maintain and submit in writing to the Owner an affirmative action program if at least fifty (50) persons in the aggregate are employed under this contract. If less than fifty (50) persons in the aggregate are to be employed under this contract, the Contractor shall submit, in lieu of the written affirmative action program, a properly executed Affidavit for Affirmative Action

in the form included in the contract specifications. For the purpose of this section, an "affirmative action program" means positive action to influence all employment practices (including, but not limited to, recruiting, hiring, promoting and training) in providing equal employment opportunity regardless of race, color, sex, national origin, religion, age (where the person affected is between age 40 and 70), disabled and Vietnam-era veteran status, and disability. Such "affirmative action program" shall include:

1. A written policy statement committing the total organization to affirmative action and assigning management responsibilities and procedures for evaluation and dissemination;
2. The identification of a person designated to handle affirmative action;
3. The establishment of non-discriminatory selection standards, objective measures to analyze recruitment, an upward mobility system, a wage and salary structure, and standards applicable to lay-off, recall, discharge, demotion and discipline;
4. The exclusion of discrimination from all collective bargaining agreements; and
5. Performance of an internal audit of the reporting system to monitor execution and to provide for future planning.

In the enforcement of this non-discrimination clause, the Owner may use any reasonable procedures available, including, but not limited to: requests, reports, site visits and inspection of relevant documents of contractors and subcontractors.

C. In the event of the Contractor's or his subcontractor's noncompliance with any provisions of this Article of the Contract, the Owner may cancel this contract in whole or in part or require the Contractor to terminate his contract with the subcontractor.

ARTICLE 1.5 - ANTI-KICKBACK

No employee of the division, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract or in any part hereof. No officer, employee, designer, attorney, or administrator of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract, any material supply contract, subcontract,

insurance contract, or any other contract pertaining to the project.

ARTICLE 1.6 - PATENTS AND ROYALTIES

- A. The Contractor shall hold and save the Owner and its officers, agents, servants and employees harmless from liabilities of any nature or kind, including cost and expenses, for, or on account of, any patented or unpatented invention, process, article or appliance manufactured or used in the performance of this contract, including its use by the Owner, unless otherwise specifically stipulated in the contract documents.
- B. If the Contractor uses any design, device or materials covered by letters, patent or copyright, the Contractor shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, without exception, that the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract and shall indemnify the Owner for any cost, expense or damage it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

ARTICLE 1.7 - PREFERENCE FOR AMERICAN AND MISSOURI PRODUCTS AND SERVICES

- A. By virtue of statutory authority a preference will be given to Missouri labor and to products of mines, forests and quarries of the state of Missouri when they are found in marketable quantities in the state, and all such materials shall be of the best quality and suitable character that can be obtained at reasonable market prices, all as provided for in Section 8.280, Missouri Revised Statutes and Cumulative Supplements.
- B. Furthermore, pursuant to Section 34.076 Missouri Revised Statutes and Cumulative Supplements, a preference shall be given to those persons doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less. In addition, in order for a non-domiciliary bidder to be successful, his bid must be that same percentage lower than a domiciliary Missouri bidder's bid, as would be

required for a Missouri bidder to successfully bid in the non-domiciliary state.

- C. In accordance with the Missouri Domestic Products Procurement Act Section 34.350 RSMo and Cumulative Supplements any manufactured goods or commodities used or supplied in the performance of this contract or any subcontract thereto shall be manufactured, assembled or produced in the United States, unless the specified products are not manufactured, assembled or produced in the United States in sufficient quantities to meet the agency's requirements or cannot be manufactured, assembled or produced in the United States within the necessary time in sufficient quantities to meet the contract requirements, or if obtaining the specified products manufactured, assembled or produced in the United States would increase the cost of this contract for purchase of the product by more than ten percent.

ARTICLE 1.8 - COMMUNICATIONS

- A. All notices, requests, instructions, approvals and claims must be in writing and shall be delivered to the Designer and copied to the Construction Representative for the project except as required by Article 1.12 Disputes and Disagreements, or as otherwise specified by the Owner in writing as stated in Section 012600. Any such notice shall be deemed to have been given as of the time of actual receipt.
- B. The Contractor shall attend on-site progress and coordination meetings, as scheduled by the Construction Representative, no less than once a month.
- C. The Contractor shall ensure that major subcontractors and suppliers shall attend monthly progress meetings as necessary to coordinate the work, and as specifically requested by the Construction Representative.

ARTICLE 1.9 - SEPARATE CONTRACTS AND COOPERATION

- A. The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.
- B. The Contractor shall consult the drawings for all other contractors in connection with this work. Any work conflicting with the above shall be brought to the attention of the Owner's Representative before the work is performed. If the Contractor fails to do this, and constructs any

work which interferes with the work of another contractor, the Contractor shall remove any part so conflicting and rebuild same, as directed by the Owner's Representative at no additional cost to the Owner.

- C. Each contractor shall be required to coordinate his work with other contractors so as to afford others reasonable opportunity for execution of their work. No contractor shall delay any other contractor by neglecting to perform contract work at the proper time. If any contractor causes delay to another, they shall be liable directly to that contractor for such delay in addition to any liquidated damages which might be due the Owner.
- D. Should the Contractor or project associated subcontractors refuse to cooperate with the instructions and reasonable requests of other Contractors or other subcontractors in the overall coordinating of the work, the Owner may take such appropriate action and issue directions, as required, to avoid unnecessary and unwarranted delays.
- E. Each Contractor shall be responsible for damage done to Owner's or other Contractor's property by him/her or workers in his employ through their fault or negligence.
- F. Should a Contractor sustain any damage through any act or omission of any other Contractor having a contract with the Owner, the Contractor so damaged shall have no claim or cause of action against the Owner for such damage, but shall have a claim or cause of action against the other Contractor to recover any and all damages sustained by reason of the acts or omissions of such Contractor. The phrase "acts or omissions" as used in this section shall be defined to include, but not be limited to, any unreasonable delay on the part of any such contractors.

ARTICLE 1.10 - ASSIGNMENT OF CONTRACT

- A. No assignment by Contractor of any amount or any part of this contract or of the funds to be received there under will be recognized unless such assignment has had the written approval of the Director and the surety has been given due notice of such assignment and has furnished written consent thereto. In addition to the usual recitals in assignment contracts, the following language must be set forth: "It is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of this contract and to claims or liens for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials."

ARTICLE 1.11 - INDEMNIFICATION

- A. Contractor agrees to indemnify and save harmless Owner and its respective commissioners, officers, officials, agents, consultants and employees and Designer, their agents, servants and employees, from and against any and all liability for damage arising from injuries to persons or damage to property occasioned by any acts or omissions of Contractor, any subcontractors, agents, servants or employees, including any and all expense, legal or otherwise, which may be incurred by Owner or Designer, its agents, servants or employees, in defense of any claim, action or suit.
- B. The obligations of the Contractor under this paragraph shall not extend to the liability of the Designer, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, contract changes, design or specifications, or (2) giving of or the failure to give directions or instructions by the Designer, his agents or employees as required by this contract documents provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 1.12 - DISPUTES AND DISAGREEMENTS

It is hereby expressly agreed and understood that in case any controversy or difference of opinion arises during construction, best efforts will be given to resolution at the field level. Should those efforts be unsuccessful, the Contractor has the right to appeal in writing, the decision of the Director's Designee to the Director at Room 730 Truman Building, P.O. Box 809, Jefferson City, Missouri 65102. The decision of the Director shall be final and binding on all parties.

ARTICLE 2 -- OWNER/DESIGNER RESPONSIBILITIES

- A. The Owner shall give all orders and directions contemplated under this contract relative to the execution of the work. During progress of work the Owner will be represented at the project site by the Construction Representative and/or Designer, whose responsibilities are to see that this contract is properly fulfilled.
- B. The Owner shall at all times have access to the work whenever it is in preparation or progress. The Contractors shall provide proper facilities for such access and for inspection and supervision.
- C. All materials and workmanship used in the work shall be subject to the inspection of the Designer and Construction Representative, and any work which is deemed defective shall be removed, rebuilt or made good immediately upon notice.

The cost of such correction shall be borne by the Contractor. Contractor shall not be entitled to an extension of the contract completion date in order to remedy defective work. All rejected materials shall be immediately removed from the site of the work.

- D. If the Contractor fails to proceed at once with the correction of rejected defective materials or workmanship, the Owner may, by separate contract or otherwise, have the defects remedied or rejected. Materials removed from the site and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.
- E. Failure or neglect on the part of Owner to observe faulty work, or work done which is not in accordance with the drawings and specifications shall not relieve the Contractor from responsibility for correcting such work without additional compensation.
- F. The Owner shall have the right to direct the Contractor to uncover any completed work.
 - 1. If the Contractor fails to adequately notify the Construction Representative and/or Designer of an inspection as required by the Contract Documents, the Contractor shall, upon written request, uncover the work. The Contractor shall bear all costs associated with uncovering and again covering the work exposed.
 - 2. If the Contractor is directed to uncover work, which was not otherwise required by the Contract Documents to be inspected, and the work is found to be defective in any respect, no compensation shall be allowed for this work. If, however, such work is found to meet the requirements of this contract, the actual cost of labor and material necessarily involved in the examination and replacement plus 10% shall be allowed the Contractor.
- G. The Designer shall give all orders and directions contemplated under this contract relative to the scope of the work and shall give the initial interpretation of the contract documents.
- H. The Owner may file a written notice to the Contractor to dismiss immediately any subcontractors, project managers, superintendents, foremen, workers, watchmen or other employees whom the Owner may deem incompetent, careless or a hindrance to proper or timely execution of the work. The Contractor shall comply with such notice as promptly as practicable without detriment to the work or its progress.

- I. If in the Owner's judgment it becomes necessary at any time to accelerate work, when ordered by the Owner in writing, the Contractor shall redirect resources to such work items and execute such portions of the work as may be required to complete the work within the current approved contract schedule.

ARTICLE 3 -- CONTRACTOR RESPONSIBILITIES

The Contractor shall register and utilize the Owner's eBuilder digital project management system for submission of documents described in the following sections. This includes but is not limited to submittals as required by designer, payment applications, Request for Information (RFI), construction change orders, Request for Proposals (RFP), Designer Supplemental Instructions (DSI), etc.

ARTICLE 3.1 -- ACCEPTABLE SUBSTITUTIONS

- A. The Contractor may request use of any article, device, product, material, fixture, form or type of construction which in the judgment of the Owner and Designer is equal in all respects to that named. Standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner and Designer that they are equal in design, strength, durability, usefulness and convenience for the purpose intended.
- B. Any changes required in the details and dimensions indicated on the drawings for the substitution of products other than those specified shall be properly made at the expense of the Contractor requesting the substitution or change.
- C. The Contractor shall submit a request for such substitutions in writing to the Owner and Designer within twenty (20) working days after the date of the "Notice to Proceed." Thereafter no consideration will be given to alternate forms of accomplishing the work. This Article does not preclude the Owner from exercising the provisions of Article 4 hereof.
- D. Any request for substitution by the Contractor shall be submitted in accordance with SECTION 002113 - INSTRUCTIONS TO BIDDERS.
- E. When a material has been approved, no change in brand or make will be permitted unless:
 - 1. Written verification is received from the manufacturer stating they cannot make delivery on the date previously agreed, or
 - 2. Material delivered fails to comply with contract requirements.

ARTICLE 3.2 -- SUBMITTALS

- A. The Contractor's submittals must be submitted with such promptness as to allow for review and approval so as not to cause delay in the work. The Contractor shall coordinate preparation and processing of submittals with performance of construction activities.

Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

Submit four (4) copies to the Designer and additional copies as required for the subcontractors and material suppliers. Also provide copies to meet the requirements for maintenance manuals.

- B. All subcontractors' shop drawings and schedules shall be submitted by the Contractor and shall bear evidence that Contractor has received, reviewed, and approved them. Any shop drawings and schedules submitted without this evidence will be returned to the Contractor for resubmission.
- C. The Contractor shall include with the shop drawing, a letter indicating any and all deviations from the drawings and/or specifications. Failure to notify the Designer of such deviations will be grounds for subsequent rejection of the related work or materials. If, in the opinion of the Designer, the deviations are not acceptable, the Contractor will be required to furnish the item as specified and indicated on the drawings.
- D. The Designer shall check shop drawings and schedules with reasonable promptness and approve them only if they conform to the design concept of the project and comply with the information given in the contract documents. The approval shall not relieve the Contractor from the responsibility to comply with the drawings and specifications, unless the Contractor has called the Designer's attention to the deviation, in writing, at the time of submission and the Designer has knowingly approved thereof. An approval of any such modification will be given only under the following conditions:
1. It is in the best interest of the Owner
 2. It does not increase the contract sum and/or completion time
 3. It does not deviate from the design intent
 4. It is without prejudice to any and all rights under the surety bond.
- E. No extension of time will be granted because of the Contractor's failure to submit shop drawings and schedules in ample time to allow for review,

possible resubmission, and approval. Fabrication of work shall not commence until the Contractor has received approval. The Contractor shall furnish prints of approved shop drawings and schedules to all subcontractors whose work is in any way related to the work under this contract. Only prints bearing this approval will be allowed on the site of construction

- F. The Contractor shall maintain a complete file on-site of approved shop drawings available for use by the Construction Representative.

ARTICLE 3.3 – AS-BUILT DRAWINGS

- A. The Contractor shall update a complete set of the construction drawings, shop drawings and schedules of all work monthly by marking changes, and at the completion of their work (prior to submission of request for final payment) note all changes and turn the set over to the Construction Representative. The updates shall show all addenda, all field changes that were made to adapt to field conditions, changes resulting from contract changes or supplemental instructions, and all locations of structures, buried installations of piping, conduit, and utility services. All buried and concealed items both inside and outside shall be accurately located as to depth and referenced to permanent features such as interior or exterior wall faces and dimensions shall be given in a neat and legible manner in a contrasting colored pencil or ink. If approved by the Designer, an electronic file format may be provided.

ARTICLE 3.4 – GUARANTY AND WARRANTIES

- A. General Guaranty
1. Neither the final certificate of payment nor any provision in the contract documents nor partial use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with contract requirements.
 2. The Contractor or surety shall remedy any defects in the work and pay for any damage to property resulting there from which shall appear within a period of one (1) year from the date of substantial completion unless a longer period is otherwise specified or a differing guaranty period has been established in the substantial completion certificate. The Owner will give notice of observed defects with reasonable promptness.
 3. In case of default on the part of the Contractor in fulfilling this part of this contract, the Owner may correct the work or repair the

damage and the cost and expense incurred in such event shall be paid by or recoverable from the Contractor or surety.

4. The work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's guaranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment

B. Extended Warranty

Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year. Where a longer period is offered at no additional cost or called for in the specific equipment specifications, the longer period shall govern.

ARTICLE 3.5 -- OPERATION AND MAINTENANCE MANUALS

- A. Immediately after equipment submittals are approved and no later than ten (10) working days prior to the substantial completion inspection, the Contractor shall provide to the Designer three (3) copies of operating instructions and service manuals, containing the following:

1. Start-up and Shut-down Procedures: Provide a step-by-step write up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available; they may be incorporated into the operating manual for reference.
2. Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.
3. Equipment List: List of all major equipment as installed shall be prepared to include model number, capacities, flow rate, name place data, shop drawings and air and water balance reports.
4. Service Instructions: Provide the following information for all pieces of equipment.

- a. Recommended spare parts including catalog number and name of local supplier or factory representative.
- b. Belt sizes, types, and lengths.
- c. Wiring diagrams.

5. Manufacturer's Certificate of Warranty as described in Article 3.4.

6. Prior to the final payment, furnish to the Designer three (4) copies of parts catalogs for each piece of equipment furnished by him/her on the project with the components identified by number for replacement ordering.

- B. Submission of operating instructions shall be done in the following manner.

1. Manuals shall be in quadruplicate, and all materials shall be bound into volumes of standard 8½" x 11" hard binders. Large drawings too bulky to be folded into 8½" x 11" shall be separately bound or folded and in envelopes, cross referenced and indexed with the manuals.

2. The manuals shall identify project name, project number, and include the name and address of the Contractor, subcontractors and manufacturers who were involved with the activity described in that particular manual.

3. Internally subdivide the binder contents with permanent page dividers, logically organized with tab titles clearly printed under reinforced laminated plastic tabs.

4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified.

ARTICLE 3.6 – OTHER CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall keep on site, during progress of the work, a competent superintendent satisfactory to the Construction Representative. The superintendent shall represent the Contractor and all agreements made by the superintendent shall be binding. The superintendent shall carefully study and compare all drawings, specifications and other instructions and shall promptly notify the Construction Representative and Designer, in writing, any error, inconsistency or omission which may be discovered. The superintendent shall coordinate all work on the project. Any change of the superintendent shall be approved by the Construction Representative.
- B. Contractor shall, at all times, enforce strict discipline and good order among his employees,

and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him/her.

- C. The Contractor shall supply sufficient labor, material, plant and equipment and pay when due any laborer, subcontractor or supplier for supplies furnished and otherwise prosecute the work with diligence to prevent work stoppage and insure completion thereof within the time specified.
- D. The Contractor and each of his subcontractors shall submit to the Construction Representative, through the Designer such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this contract.
- E. The Contractor, subcontractors, and material suppliers shall upon written request, give the Owner access to all time cards, material invoices, payrolls, estimates, profit and loss statements, and all other direct or indirect costs related to this work.
- F. The Contractor shall be responsible for laying out all contract work such as layout of architectural, structural, mechanical and electrical work, which shall be coordinated with layouts of subcontractors for general construction work. The Contractor is also responsible for unloading, uncrating and handling of all materials and equipment to be erected or placed by him/her, whether furnished by Contractor or others. No extra charges or compensation will be allowed as a result of failure to verify dimensions before ordering materials or fabricating items.
- G. The Contractor must notify the Construction Representative at least one working day before placing concrete or burying underground utilities, pipelines, etc.
- H. Contractors shall prearrange time with the Construction Representative for the interruption of any facility operation. Unless otherwise specified in these documents, all connections, alterations or relocations as well as all other portions of the work will be performed during normal working hours.
- I. The Contractor shall coordinate all work so there will not be prolonged interruptions of existing equipment operation. Any existing plumbing, heating, ventilating, air conditioning or electrical disconnections necessary for the project, which affect portions of this construction or building or any other building must be scheduled with the Construction Representative to minimize or avoid any disruption of facility operations. In no case,

unless previously approved in writing by the Construction Representative, shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities either intentionally or accidentally shall not relieve the Contractor responsible for the interruption from the responsibility to repair and restore the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.

- J. Contractors shall limit operations and storage of materials to the area within the project, except as necessary to connect to existing utilities, and shall not encroach on neighboring property. The Contractor shall be responsible for repair of their damage to property on or off the project site occurring during construction of project. All such repairs shall be made to the satisfaction of the property owner.
- K. Unless otherwise permitted, all materials shall be new and both workmanship and materials shall be of the best quality.
- L. Unless otherwise provided and stipulated within these specifications, the Contractor shall furnish, construct, and/or install and pay for materials, devices, mechanisms, equipment, all necessary personnel, utilities including, but not limited to water, heat, light and electric power, transportation services, applicable taxes of every nature, and all other facilities necessary for the proper execution and completion of the work.
- M. Contractor shall carefully examine the plans and drawings and shall be responsible for the proper fitting of his material, equipment and apparatus into the building.
- N. The Contractor or subcontractors shall not overload, or permit others to overload, any part of any structure during the performance of this contract.
- O. All temporary shoring, bracing, etc., required for the removal of existing work and/or for the installation of new work shall be included in this contract. The Contractor shall make good, at no cost to the Owner, any damage caused by improper support or failure of shoring in any respect. Each Contractor shall be responsible for shoring required to protect his work or adjacent property and improvements of Owner and shall be responsible for shoring or for giving written notice to adjacent property owners. Shoring shall be removed only after completion of permanent supports.

- P. The Contractor shall provide at the proper time such material as is required for support of the work. If openings are required, whether shown on drawings or not, the Contractor shall see that they are properly constructed.
- Q. During the performance of work the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences and other devices appropriately located on site which will give proper and understandable warning to all persons of danger of entry onto land, structure or equipment.
- R. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials.
- S. The Contractor shall be responsible for care of the finished work and shall protect same from damage or defacement until substantial completion by the Owner. If the work is damaged by any cause, the Contractor shall immediately begin to make repairs in accordance with the drawings and specifications. Contractor shall be liable for all damage or loss unless attributable to the acts or omissions of the Owner or Designer. Any claim for reimbursement shall be submitted in accordance with Article 4. After substantial completion the Contractor will only be responsible for damage resulting from acts or omissions of the Contractor or subcontractors through final warranty.
- T. In the event the Contractor encounters an unforeseen hazardous material, the Contractor shall immediately stop work in the area affected and report the condition to the Owner and Designer in writing. The Contractor shall not be required, pursuant to Article 4, to perform, any work relating to hazardous materials.
- U. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 4.
- V. Before commencing work, Contractors shall confer with the Construction Representative and facility representative and review any facility rules and regulations which may affect the conduct of the work.
- W. Project signs will only be erected on major projects and only as described in the specifications. If no sign is specified, none shall be erected.

ARTICLE 3.7 -- SUBCONTRACTS

- A. Subcontractor assignments as identified in the bid form shall not be changed without written approval of the Owner. The Owner will not approve changes of a listed subcontractor unless the Contractor documents, to the satisfaction of the Owner that the subcontractor cannot or will not perform the work as specified.
- B. The Contractor is fully responsible to the Owner for the acts and omissions of all subcontractors and of persons either directly or indirectly employed by them.
- C. Every subcontractor shall be bound by the applicable terms and provisions of these contract documents, but no contractual relationship shall exist between any subcontractor and the Owner unless the right of the Contractor to proceed with the work is suspended or this contract is terminated as herein provided, and the Owner in writing elects to assume the subcontract.
- D. The Contractor shall upon receipt of "Notice to Proceed" and prior to submission of the first payment request, notify the Designer and Construction Representative in writing of the names of any subcontractors to be used in addition to those identified in the bid form and all major material suppliers proposed for all parts of the work.

ARTICLE 4 -- CHANGES IN THE WORK

4.1 CHANGES IN THE WORK

- A. The Construction Representative, without giving notice to the surety and without invalidating this contract, may order extra work or make changes by altering, adding to or deducting from the work, this contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract. A claim for extension of time caused by any change must be adjusted at the time of ordering such change. No future request for time will be considered.
- B. Each Contract Change shall include all costs required to perform the work including all labor, material, equipment, overheads and profit, delay, disruptions, or other miscellaneous expenses. No subsequent requests for additional compensation including claims for delay, disruption, or reduced efficiency as a result of each change will be considered. Values from the Schedule of Values will not be binding as a basis for additions to or deductions from the contract price.
- C. The amount of any adjustment in this contract price for authorized changes shall be agreed upon

before such changes become effective and shall be determined, through submission of a request for proposal, as follows:

1. By an acceptable fixed price proposal from the Contractor. Breakdowns shall include all takeoff sheets of each Contractor and subcontractor. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.
2. By a cost-plus-fixed-fee (time and material) basis with maximum price, total cost not to exceed said maximum. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.
3. By unit prices contained in Contractor's original bid form and incorporated in the construction contract.

D. Overhead and Profit on Contract Changes shall be applied as follows:

1. The overhead and profit charge by the Contractor and all subcontractors shall be considered to include, but is not limited to: incidental job burdens, small truck (under 1 ton) expense, mileage, small hand tools, warranty costs, company benefits and general office overhead. Project supervision including field supervision and job site office expense shall be considered a part of overhead and profit unless a compensable time extension is granted.
2. The percentages for overhead and profit charged on Contract Changes shall be subject to the following limits: (a) the percentage mark-up for the Contractor shall be limited to the Contractor's fee; (b) fifteen percent (15%) maximum for Work directly performed by employees of a subcontractor, or sub-subcontractor; (c) five percent (5%) maximum for the Work performed or passed through to the Owner by the Contractor; (d) five percent (5%) maximum subcontractor's mark-up for Work performed by a sub-subcontractor and

passed through to the Owner by the subcontractor and Contractor; and (e) in no case shall the total overhead and profit paid by the Owner on any Contract Changes exceed twenty-five percent (25%) of the cost of materials, labor and equipment (exclusive of Contractor or any Subcontractor overhead and profit) necessary to put the contract change work in place.

3. The Contractor will be allowed to add the cost of Contractor's payment and performance bonding, builder's risk insurance, and general liability insurance to their cost of work. The above listed bonding and insurance cost shall not exceed 2% and shall be allowed on the total cost of the added work, including overhead and profit.
 4. On proposals covering both increases and decreases in the amount of this contract, the application of overhead and profit shall be on the net change in the cost of the work.
 5. The percentage(s) for overhead and profit to be credited to the Owner on Contract Changes that are solely decreases in the quantity of work or materials shall be the same as those for additive Contract Changes provided above.
- E. No claim for an addition to this contract sum shall be valid unless authorized as aforesaid in writing by the Owner. In the event that none of the foregoing methods are agreed upon, the Owner may order the Contractor to perform work on a time and material basis. The cost of such work shall be determined by the Contractor's actual labor and material cost to perform the work plus overhead and profit as outlined herein. The Designer and Construction Representative shall approve the Contractor's daily time and material invoices for the work involved.
- F. If the Contractor claims that any instructions involve extra cost under this contract, the Contractor shall give the Owner's Representative written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute the work. No such claim shall be valid unless so made and authorized by the Owner, in writing.
- G. In an emergency affecting the safety of life or of the structure or of adjoining property, the Contractor, without special instruction or authorization from the Construction Representative, is hereby permitted to act at their discretion to prevent such threatened loss or injury. The Contractor shall submit a claim for

compensation for such emergency work in writing to the Owner's Representative.

ARTICLE 4.2 – CHANGES IN COMPLETION TIME

- A. Extension of the number of work days stipulated in the Contract for completion of the work with compensation may be made when:
 - 1. The contractor documents that proposed Changes in the work, as provided in Article 4.1, extends construction activities critical to contract completion date, OR
 - 2. The Owner suspends all work for convenience of the Owner as provided in Article 7.3, OR
 - 3. An Owner caused delay extends construction activities critical to contract completion (except as provided elsewhere in these General Conditions). The Contractor is to review the work activities yet to begin and evaluate the possibility of rescheduling the work to minimize the overall project delay.
- B. Extension of the number of work days stipulated in the Contract for completion of the work without compensation may be made when:
 - 1. Weather-related delays occur, subject to provisions for the inclusion of a specified number of "bad weather" days when provided for in Section 012100-Allowances, OR
 - 2. Labor strikes or acts of God occur, OR
 - 3. The work of the Contractor is delayed on account of conditions which were beyond the control of the Contractor, subcontractors or suppliers, and were not the result of their fault or negligence.
- C. No time extension or compensation will be provided for delays caused by or within the control of the Contractor, subcontractors or suppliers and for concurrent delays caused by the Owner.
- D. The Contractor shall notify the Owner promptly of any occurrence or conditions which in the Contractor's opinion results in a need for an extension of time. The notice shall be in writing and shall include all necessary supporting materials with details of any resultant costs and be submitted in time to permit full investigation and evaluation of the Contractor's claim. The Owner shall promptly acknowledge the Contractor's notice and, after recommendation from the Owner's Representative and/or Designer, shall provide a decision to the Contractor. Failure on the part of the Contractor to provide such notice and to detail the costs shall constitute a waiver by

the Contractor of any claim. Requests for extensions of time shall be for working days only.

ARTICLE 5 - CONSTRUCTION AND COMPLETION

ARTICLE 5.1 – CONSTRUCTION COMMENCEMENT

- A. Upon receipt of the "Intent to Award" letter, the Contractor must submit the following properly executed instruments to the Owner:
 - 1. Contract;
 - 2. Performance/payment bond as described in Article 6.1;
 - 3. Certificates of Insurance, or the actual policies themselves, showing that the Contractor has obtained the insurance coverage required by Article 6.2.
 - 4. Written Affirmative Action Plans as required in Article 1.4.
- Above referenced items must be received by the Owner within ten (10) working days after the effective date of the contract. If not received, the Owner may treat the failure to timely submit them as a refusal by the Contractor to accept a contract for this work and may retain as liquidated damages the Contractor's bid bond, cashier's check or certified check as provided in the Instructions to Bidders. Upon receipt the Owner will issue a "Notice to Proceed" with the work to the Contractor.
- B. Within the time frame noted in Section 013200 - Schedules, following receipt of the "Notice to Proceed", the Contractor shall submit to the Owner a progress schedule and schedule of values, showing activities through the end of the contract period. Should the Contractor not receive written notification from the Owner of the disapproval of the schedule of values within fifteen (15) working days, the Contractor may consider it approved for purpose of determining when the first monthly Application and Certification for Payment may be submitted.
 - C. The Contractor may commence work upon receipt of the Division of Facilities Management, Design and Construction's "Notice to Proceed" letter. Contractor shall prosecute the work with faithfulness and energy, and shall complete the entire work on or before the completion time stated in the contract documents or pay to the Owner the damages resulting from the failure to timely complete the work as set out within Article 5.4.

ARTICLE 5.2 -- PROJECT CONSTRUCTION

- A. Each Contractor shall submit for the Owner's approval, in reproducible form, a progress schedule showing the rate of progress and the order of the work proposed to carry on various phases of the project. The schedule shall be in conformance with the requirements outlined in Section 013200 – Schedules.
- B. Contractor shall employ and supply a sufficient force of workers, material, and equipment and shall pay when due, any worker, subcontractor or supplier and otherwise prosecute the work with such diligence so as to maintain the rate of progress indicated on the progress schedule, prevent work stoppage, and insure completion of the project within the time specified.

ARTICLE 5.3 -- PROJECT COMPLETION

- A. Substantial Completion. A Project is substantially complete when construction is essentially complete and work items remaining to be completed can be done without interfering with the Owner's ability to use the Project for its intended purpose.
 1. Once the Contractor has reached what they believe is Substantial Completion, the Contractor shall notify the Designer and the Construction Representative of the following:
 - a. That work is essentially complete with the exception of certain listed work items. The list shall be referred to as the "Contractor's Punch."
 - b. That all Operation and Maintenance Manuals have been assembled and submitted in accordance with Article 3.5A.
 - c. That the Work is ready for inspection by the Designer and Construction Representative. The Owner shall be entitled to a minimum of ten working days notice before the inspection shall be performed.
 2. If the work is acceptable, the Owner shall issue a Certificate of Substantial Completion, which shall set forth the responsibilities of the Owner and the Contractor for utilities, security, maintenance, damage to the work and risk of loss. The Certificate shall also identify those remaining items of work to be performed by the Contractor. All such work items shall be complete within 30 working days of the date of the Certificate, unless the Certificate specifies a different time. If the

Contractor shall be required to perform tests that must be delayed due to climatic conditions, it is understood that such tests and affected equipment will be identified on the Certificate and shall be accomplished by the Contractor at the earliest possible date. Performance of the tests may not be required before Substantial Completion can be issued. The date of the issuance of the Certificate of Substantial Completion shall determine whether or not the work was completed within the contract time and whether or not Liquidated Damages are due.

3. If the work is not acceptable, and the Owner does not issue a Certificate of Substantial Completion, the Owner shall be entitled to charge the Contractor with the Designer's and Owner's costs of re-inspection, including time and travel.
- B. Partial Occupancy. Contractor agrees that the Owner shall be permitted to occupy and use any completed or partially completed portions of the Project, when such occupancy and use is in the Owner's best interest. Owner shall notify Contractor of its desire and intention to take Partial Occupancy as soon as possible but at least ten (10) working days before the Owner intends to occupy. If the Contractor believes that the portion of the work the Owner intends to occupy is not ready for occupancy, the Contractor shall notify the Owner immediately. The Designer shall inspect the work in accordance with the procedures above. If the Contractor claims increased cost of the project or delay in completion as a result of the occupancy, he shall notify the Owner immediately but in all cases before occupancy occurs.
- C. Final Completion. The Project is finally complete when the Certificate of Substantial Completion has been issued and all work items identified therein as incomplete have been completed, and when all administrative items required by the contract have been completed. Final Completion entitles the Contractor to payment of the outstanding balance of the contract amount including all change orders and retainage. Within five (5) working days of the date of the Certificate of Substantial Completion, the Contractor shall identify the cost to complete any outstanding items of work. The Designer shall review the Contractor's estimate and either approve it or provide an independent estimate for all such items. If the Contractor fails to complete the remaining items within the time specified in the Certificate, the Owner may terminate the contract and go to the surety for project completion in accordance with Article 7.2 or release the contract balance to the Contractor less 150% of the

approved estimate to complete the outstanding items. Upon completion of the outstanding items, when a final cost has been established, any monies remaining shall be paid to the Contractor. Failure to complete items of work does not relieve the Contractor from the obligation to complete the administrative requirements of the contract, such as the provisions of Article 5.3 FAILURE TO COMPLETE ALL ITEMS OF WORK UNDER THE CONTRACT SHALL BE CONSIDERED A DEFAULT AND BE GROUNDS FOR CONTRACT TERMINATION AND DEBARMENT.

- D. Liquidated Damages. Contractor agrees that the Owner may deduct from the contract price and retain as liquidated damages, and not as penalty or forfeiture, the sum stipulated in this contract for each work day after the Contract Completion Day on which work is not Substantially Complete. Assessment of Liquidated Damages shall not relieve the Contractor or the surety of any responsibility or obligation under the Contract. In addition, the Owner may, without prejudice to any other rights, claims, or remedies the Owner may have including the right to Liquidated Damages, charge the Contractor for all additional expenses incurred by the Owner and/or Designer as the result of the extended contract period through Final Completion. Additional Expenses shall include but not be limited to the costs of additional inspections.
- E. Early Completion. The Contractor has the right to finish the work before the contract completion date; however, the Owner assumes no liability for any hindrances to the Contractor unless Owner caused delays result in a time extension to the contract completion date. The Contractor shall not be entitled to any claims for lost efficiencies or for delay if a Certificate of Substantial Completion is given on or before the Contract Completion Date.

ARTICLE 5.4 -- PAYMENT TO CONTRACTOR

- A. Payments on account of this contract will be made monthly in proportion to the work which has been completed. Request for payment must be submitted on the Owner's forms. No other pay request will be processed. Supporting breakdowns must be in the same format as Owner's forms and must provide the same level of detail. The Designer will, within 5 working days from receipt of the contractor's request for payment either issue a Certificate for Payment to the Owner, for such amount as the Designer determines is properly due, or notify the Contractor in writing of reasons for withholding a Certificate. The Owner shall make payment within 30 calendar days after the

"Application and Certification for Payment" has been received and certified by the Designer. The following items are to be attached to the contractor's pay request:

1. Updated construction schedule
 2. Certified payrolls consisting of name, occupation and craft, number of hours worked and actual wages paid for each individual employee, of the Contractor and all subcontractors working on the project
- B. The Owner shall retain 5 percent of the amount of each such payment application, except as allowed by Article 5.4, until final completion and acceptance of all work covered by this contract.
- C. Each payment made to Contractor shall be on account of the total amount payable to Contractor and all material and work covered by paid partial payment shall thereupon become the sole property of Owner. This provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made or restoration of any damaged work or as a waiver of the right of Owner to require fulfillment of all terms of this contract.
- D. Materials delivered to the work site and not incorporated in the work will be allowed in the Application and Certification for Payment on the basis of one hundred (100%) percent of value, subject to the 5% retainage providing that they are suitably stored on the site or in an approved warehouse in accordance with the following requirements:
1. Material has previously been approved through submittal and acceptance of shop drawings conforming to requirements of Article 3.2 of General Conditions.
 2. Delivery is made in accordance with the time frame on the approved schedule.
 3. Materials, equipment, etc., are properly stored and protected from damage and deterioration and remain so - if not, previously approved amounts will be deleted from subsequent pay applications.
 4. The payment request is accompanied by a breakdown identifying the material equipment, etc. in sufficient detail to establish quantity and value.
- E. The Contractor shall be allowed to include in the Application and Certification for Payment, one hundred (100%) of the value, subject to retainage,

of major equipment and material stored off the site if all of the following conditions are met:

1. The request for consideration of payment for materials stored off site is made at least 15 working days prior to submittal of the Application for Payment including such material. Only materials inspected will be considered for inclusion on Application for Payment requests.
 2. Materials stored in one location off site are valued in excess of \$25,000.
 3. That a Certificate of Insurance is provided indicating adequate protection from loss, theft conversion or damage for materials stored off site. This Certificate shall show the State of Missouri as an additional insured for this loss.
 4. The materials are stored in a facility approved and inspected, by the Construction Representative.
 5. Contractor shall be responsible for, Owner costs to inspect out of state facilities, and any delays in the completion of the work caused by damage to the material or for any other failure of the Contractor to have access to this material for the execution of the work.
- F. The Owner shall determine the amount, quality and acceptability of the work and materials which are to be paid for under this contract. In the event any questions shall arise between the parties, relative to this contract or specifications, determination or decision of the Owner or the Construction Representative and the Designer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this contract affected in any manner or to any extent by such question.
- G. Payments Withheld: The Owner may withhold or nullify in whole or part any certificate to such extent as may be necessary to protect the Owner from loss on account of:
1. Defective work not remedied. When a notice of noncompliance is issued on an item or items, corrective action shall be undertaken immediately. Until corrective action is completed, no monies will be paid and no additional time will be allowed for the item or items. The cost of corrective action(s) shall be borne by the Contractor.
 2. A reasonable doubt that this contract can be completed for the unpaid balance.

3. Failure of the Contractor to update as-built drawings monthly for review by the Construction Representative.
4. Failure of the Contractor to update the construction schedule.

When the Construction Representative is satisfied the Contractor has remedied above deficiencies, payment shall be released.

- H. Final Payment: Upon receipt of written notice from the Contractor to the Designer and Project Representative that the work is ready for final inspection and acceptance, the Designer and Project Representative, with the Contractor, shall promptly make such inspection. If the work is acceptable and the contract fully performed, the Construction Representative shall complete a final acceptance report and the Contractor will be directed to submit a final Application and Certification for Payment. If the Owner approves the same, the entire balance shall be due and payable, with the exception of deductions as provided for under Article 5.4.
1. Where the specifications provide for the performance by the Contractor of (certain tests for the purpose of balancing and checking the air conditioning and heating equipment and the Contractor shall have furnished and installed all such equipment in accordance with the specifications, but said test cannot then be made because of climatic conditions, such test shall may be considered as required under the provisions of the specifications, Section 013300 and this contract may be substantial Full payment will not be made until the tests have been made and the equipment and system is finally accepted. If the tests are not completed when scheduled, the Owner may deduct 150% of the value of the tests from the final payment.
 2. The final payment shall not become due until the Contractor delivers to the Construction Representative:
 - a) A complete file of releases, on the standard form included in the contract documents as "Final Receipt of Payment and Release Form", from subcontractors and material suppliers evidencing payment in full for services, equipment and materials, as the case may require, if the Owner approves, or a consent from the Surety to final payment accepting liability for any unpaid amounts.

- b) An Affidavit of Compliance with Prevailing Wage Law, in the form as included in this contract specifications, properly executed by each subcontractor, and the Contractor
 - c) Certified copies of all payrolls
 - d) As-built drawings
3. If any claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a claim including all costs and a reasonable attorney's fee.
 4. Missouri statute requires prompt payment from the Owner to the Contractor within thirty calendar days and from the Contractor to his subcontractors within fifteen calendar days. Failure to make payments within the required time frame entitles the receiving party to charge interest at the rate of one and one half percent per month calculated from the expiration of the statutory time period until paid.
 5. The value of all unused unit price allowances and/or 150% of the value of the outstanding work items, and/or liquidated damages may be deducted from the final pay request without executing a Contract Change. Any unit price items which exceed the number of units in the contract may be added by Contract Change.

ARTICLE 6 -- INSURANCE AND BONDS

ARTICLE 6.1 -- BOND

- A. Contractor shall furnish a performance/payment bond in an amount equal to 100% of the contract price to guarantee faithful performance of the contract and 100% of the contract price to guarantee the payment of all persons performing labor on the project and furnishing materials in connection therewith under this contract as set forth in the standard form of performance and payment bond included in the contract documents. The surety on such bond shall be issued by a surety company authorized by the Missouri Department of Insurance to do business in the state of Missouri.
- B. All Performance/Payment Bonds furnished in response to this provision shall be provided by a bonding company with a rating of B+ or higher as established by A.M. Best Company, Inc. in their most recent publication.

ARTICLE 6.2 – INSURANCE

- A. The successful Contractor shall procure and maintain for the duration of the contract issued a policy or policies of insurance for the protection of both the Contractor and the Owner and their respective officers, officials, agents, consultants and employees. The Owner requires certification of insurance coverage from the Contractor prior to commencing work.
- B. Minimum Scope and Extent of Coverage
 1. General Liability

Commercial General Liability, ISO coverage form number or equivalent CG 00 01 ("occurrence" basis), or I-SO coverage form number CG 00 02, or ISO equivalent.

If ISO equivalent or manuscript general liability coverage forms are used, minimum coverage will be as follows: Premises/Operations; Independent Contractors; Products/Completed Operations; personal Injury; Broad Form Property Damage including Completed Operations; Broad Form Contractual Liability Coverage to include Contractor's obligations under Article 1.11 Indemnification and any other Special Hazards required by the work of the contract.
 2. Automobile Liability

Business Automobile Liability Insurance, ISO Coverage form number or equivalent CA 00 01 covering automobile liability, code 1 "ANY AUTO".
 3. Workers' Compensation and Employer's Liability

Statutory Workers' Compensation Insurance for Missouri and standard Employer's Liability Insurance, or the authorization to self-insure for such liability from the Missouri Division of Workers' Compensation.
 4. Builder's Risk or Installation Floater Insurance

Insurance upon the work and all materials, equipment, supplies, temporary structures and similar items which may be incident to the performance of the work and located at or adjacent to the site, against loss or damage from fire and such other casualties as are included in extended coverage in broad "All Risk" form, including coverage for Flood and Earthquake, in an amount not less than the replacement cost of the work or this contract price, whichever is greater, with loss payable

to Contractor and Owner as their respective interests may appear.

Contractor shall maintain sufficient insurance to cover the full value of the work and materials as the work progresses, and shall furnish Owner copies of all endorsements. If Builder's Risk Reporting- Form of Endorsement is used, Contractor shall make all reports as required therein so as to keep in force an amount of insurance which will equal the replacement cost of the work, materials, equipment, supplies, temporary structures, and other property covered thereby; and if, as a result of Contractor's failure to make any such report, the amount of insurance so recoverable shall be less than such replacement cost, Contractor's interest in the proceeds of such insurance, if any, shall be subordinated to Owner's interest to the end that Owner may receive full reimbursement for its loss.

C. Minimum Limits of Insurance

1. General Liability

Contractor

\$2,000,000 combined single limit per occurrence for bodily injury, personal injury, and property damage

\$2,000,000 annual aggregate

2. Automobile Liability

\$2,000,000 combined single limit per occurrence for bodily injury and property damage

3. Workers' Compensation and Employers Liability

Workers' Compensation limits as required by applicable State Statutes (generally unlimited) and minimum of \$1,000,000 limit per accident for Employer's Liability.

General Liability and Automobile Liability insurance may be arranged under individual policies for the full limits required or by a combination of underlying policies with the balance provided by a form-following Excess or Umbrella Liability policy.

D. Deductibles and Self-Insured Retentions

All deductibles, co-payment clauses, and self-insured retentions must be declared to and approved by the Owner. The Owner reserves the right to request the reduction or elimination of unacceptable deductibles or self-insured retentions,

as they would apply to the Owner, and their respective officers, officials, agents, consultants and employees. Alternatively, the Owner may request Contractor to procure a bond guaranteeing payment of losses and related investigations, claims administration, and defense expenses.

E. Other Insurance Provisions and Requirements

The respective insurance policies and coverage, as specified below, must contain, or be endorsed to contain the following conditions or provisions:

1. General Liability

The Owner, and its respective commissioners, officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 Additional Insured - Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance of self-insurance programs maintained by the designated additional -insured's shall be excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's general liability insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner, or for any of their officers, officials, agents, consultants or employees.

2. Automobile Insurance

The Owner, and their respective officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 - Additional Insured Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the

performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance or self-insurance programs maintained by the designated additional insured's shall be in excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's automobile insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner or for any of its officers, officials, agents, consultants or employees.

3. Workers' Compensation/Employer's Liability

Contractor's workers' compensation insurance shall be endorsed with NCCI form WC 00 03 01 A - Alternative Employer Endorsement. The Alternative Employer Endorsement shall designate the Owner as "alternate employers."

4. All Coverages

Each insurance policy required by this section of the Contract shall contain a stipulation, endorsed if necessary, that the Owner will receive a minimum of a thirty (30) calendar day advance notice of any policy cancellation. Ten (10) calendar days advance notice is required for policy cancellation due to non-payment of premium.

F. Insurer Qualifications and Acceptability

Insurance required hereunder shall be issued by an A.M. Best, "B+" rated, Class IX insurance company approved to conduct insurance business in the state of Missouri.

G. Verification of Insurance Coverage

Prior to Owner issuing a Notice to Proceed, the Contractor shall furnish the Owner with Certificate(s) of Insurance and with any applicable original endorsements evidencing the required insurance coverage. The insurance certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its

behalf. All certificates and endorsements received by the Owner are subject to review and approval by the Owner. The Owner reserves the right to require certified copies of all required policies at any time. If the scope of this contract will exceed one (1) year - or, if any of Contractor's applicable insurance coverage expires prior to completion of the work or services required under this contract - the Contractor will provide a renewal or replacement certificate before continuing work or services hereunder. If the Contractor fails to provide documentation of required insurance coverage, the Owner may issue a stop work order and no additional contract completion time and/or compensation shall be granted as a result thereof.

ARTICLE 7 – SUSPENSION OR TERMINATION OF CONTRACT

ARTICLE 7.1 - FOR SITE CONDITIONS

When conditions at the site of the proposed work are considered by the Owner to be unsatisfactory for prosecution of the work, the Contractor may be ordered in writing to suspend the work or any part thereof until reasonable conditions exist. When such suspension is not due to fault or negligence of the Contractor, time allowed for completion of such suspended work will be extended by a period of time equal to that lost due to delay occasioned by ordered suspension. This will be a no cost time extension.

ARTICLE 7.2 - FOR CAUSE

A. Termination or Suspension for Cause:

1. If the Contractor shall file for bankruptcy, or should make a general assignment for the benefit of the creditors, or if a receiver should be appointed on account of insolvency, or if the contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials, or if the contractor should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of this contract, then the Owner may serve notice on the Contractor and the surety setting forth the violations and demanding compliance with this contract. Unless within ten (10) consecutive calendar days after serving such notice, such violations shall cease and satisfactory arrangements for correction be made, the Owner may suspend the Contractor's right to proceed with the work or terminate this contract.

2. In the event the Owner suspends Contractor's right to proceed with the work or terminates the contract, the Owner may demand that the Contractor's surety take over and complete the work on this contract, after the surety submits a written proposal to the Owner and receives written approval and upon the surety's failure or refusal to do so within ten (10) consecutive calendar days after demand therefore, the Owner may take over the work and prosecute the same to completion by bid or negotiated contract, or the Owner may elect to take possession of and utilize in completing the work such materials, supplies, appliances and plant as may be on the site of the work, and all subcontractors, if the Owner elects, shall be bound to perform their contracts.
- B. The Contractor and its surety shall be and remain liable to the Owner for any excess cost or damages occasioned to the Owner as a result of the actions above set forth.
- C. The Contractor in the event of such suspension or termination shall not be entitled to receive any further payments under this contract until the work is wholly finished. Then if the unpaid balance under this contract shall exceed all expenses of the Owner as certified by the Director, such excess shall be paid to the Contractor; but, if such expenses shall exceed the unpaid balance as certified by the Director, the Contractor and their surety shall be liable for and shall pay the difference and any damages to the Owner.
- D. In exercising Owner's right to secure completion of the work under any of the provisions hereof, the Director shall have the right to exercise Owner's sole discretion as to the manner, methods and reasonableness of costs of completing the work.
- E. The rights of the Owner to suspend or terminate as herein provided shall be cumulative and not exclusive and shall be in addition to any other remedy provided by law.
- F. The Contractor in the event of such suspension or termination may be declared ineligible for Owner contracts for a minimal period of twelve (12) months. Further, no contract will be awarded to any Contractor who lists in their bid form any subcontractor whose prior performance has contributed, as determined by the Owner, to a breach of a contract. In order to be considered for state-awarded contracts after this period, the Contractor/subcontractor will be required to forward acceptance reports to the Owner regarding successful completion of non-state projects during the intervening twelve (12) months from the date

of default. No contracts will be awarded to a subcontractor/Contractor until the ability to perform responsibly in the private sector has been proven to the Owner.

ARTICLE 7.3 -- FOR CONVENIENCE

- A. The Owner may terminate or suspend the Contract or any portion of the Work without cause at any time, and at the Owner's convenience. Notification of a termination or suspension shall be in writing and shall be given to the Contractor and their surety. If the Contract is suspended, the notice will contain the anticipated duration of the suspension or the conditions under which work will be permitted to resume. If appropriate, the Contractor will be requested to demobilize and re-mobilize and will be reimbursed time and costs associated with the suspension.
- B. Upon receipt of notification, the Contractor shall:
 1. Cease operations when directed.
 2. Take actions to protect the work and any stored materials.
 3. Place no further subcontracts or orders for material, supplies, services or facilities except as may be necessary to complete the portion of the Contract that has not been terminated. No claim for payment of materials or supplies ordered after the termination date shall be considered.
 4. Terminate all existing subcontracts, rentals, material, and equipment orders.
 5. Settle all outstanding liabilities arising from termination with subcontractors and suppliers.
 6. Transfer title and deliver to the Owner, work in progress, completed work, supplies and other material produced or acquire for the work terminated, and completed or partially completed plans, drawings information and other property that, if the Contract had been completed, would be required to be furnished to the Owner.
- C. For termination without cause and at the Owner's convenience, in addition to payment for work completed prior to date of termination, the Contractor may be entitled to payment of other documented costs directly associated with the early termination of the contract. Payment for anticipated profit and unapplied overhead will not be allowed.

SECTION 007300 - SUPPLEMENTARY CONDITIONS

1.0 GENERAL:

A. These Supplementary General Conditions clarify, add, delete, or otherwise modify standard terms and conditions of DIVISION 0, BIDDING AND CONTRACTING REQUIREMENTS.

2.0 CONTACTS:

Designer: Sarah Dollar
McClure Engineering
1000 Clark Ave
St. Louis, MO 63102
Telephone: 314-806-0091
Email: sdollar@mcclureeng.com

Construction Representative: Bob Rehagen
Division of Facilities Management, Design and Construction
709 Missouri Blvd (Upper Level)
Jefferson City, MO 65109
Telephone: 573-522-0002
Email: Robert.Rehagen@oa.mo.gov

Project Manager: Frank Cunningham
Division of Facilities Management, Design and Construction
301 West High Street, Room 730
Jefferson City, Missouri 65101
Telephone: 573-395-6216
Email: frank.cunningham@oa.mo.gov

Contract Specialist: Paul Girouard
Division of Facilities Management, Design and Construction
301 West High Street, Room 730
Jefferson City, Missouri 65102
Telephone: (573) 751-4797
Email: Paul.Girouard@oa.mo.gov

3.0 NOTICE: ALL BID MATERIALS ARE DUE AT THE TIME OF BID SUBMITTAL. THERE IS NO SECOND SUBMITTAL FOR THIS PROJECT.

4.0 FURNISHING CONSTRUCTION DOCUMENTS:

- A. The Owner will furnish the Contractor with approximately 10 complete sets of drawings and specifications at no charge.
- B. The Owner will furnish the Contractor with approximately 10 sets of explanatory or change drawings at no charge.
- C. The Contractor may make copies of the documents as needed with no additional cost to the Owner.

5.0 SAFETY REQUIREMENTS

Contractor and subcontractors at any tier shall comply with RSMo 292.675 and Article 1.3, E, of Section 007213, General Conditions.

Missouri

Division of Labor Standards

WAGE AND HOUR SECTION



MICHAEL L. PARSON, Governor

Annual Wage Order No. 30

Section 026
COLE COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by _____

Todd Smith, Director
Division of Labor Standards

Filed With Secretary of State: _____ **March 10, 2023**

Last Date Objections May Be Filed: **April 10, 2023**

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Asbestos Worker	\$60.26
Boilermaker	\$28.77*
Bricklayer	\$55.66
Carpenter	\$49.39
Lather	
Linoleum Layer	
Millwright	
Pile Driver	
Cement Mason	\$43.32
Plasterer	
Communications Technician	\$57.11
Electrician (Inside Wireman)	\$58.40
Electrician Outside Lineman	\$28.77*
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Elevator Constructor	\$98.59
Glazier	\$28.77*
Ironworker	\$62.53
Laborer	\$43.32
General Laborer	
First Semi-Skilled	
Second Semi-Skilled	
Mason	\$28.77*
Marble Mason	
Marble Finisher	
Terrazzo Worker	
Terrazzo Finisher	
Tile Setter	
Tile Finisher	
Operating Engineer	\$62.81
Group I	
Group II	
Group III	
Group III-A	
Group IV	
Group V	
Painter	\$41.55
Plumber	\$68.06
Pipe Fitter	
Roofer	\$52.39
Sheet Metal Worker	\$56.48
Sprinkler Fitter	\$64.54
Truck Driver	\$28.77*
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in RSMO Section 290.210.

Heavy Construction Rates for
COLE County

Section 026

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Carpenter	\$53.39
Millwright	
Pile Driver	
Electrician (Outside Lineman)	\$28.77*
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Laborer	\$47.92
General Laborer	
Skilled Laborer	
Operating Engineer	\$60.89
Group I	
Group II	
Group III	
Group IV	
Truck Driver	\$47.77
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.

OVERTIME and HOLIDAYS

OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "**overtime work**" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

SECTION 011000 – SUMMARY OF WORK

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 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of a fourteen-story plus basement office renovation including upgrades to meet new mechanical, electrical, ADA and life safety codes.
 - 1. Project Location:
205 Jefferson Street
Jefferson City, Missouri 65101
 - 2. Owner: State of Missouri, Office of Administration, Division of Facilities Management, Design and Construction, Harry S Truman State Office Building, Post Office Box 809, 301 West High Street, Jefferson City, Missouri 65102.
- B. Contract Documents, dated **August 31, 2023** were prepared for the Project by McClure Engineering.
- C. The Work consists of the renovation of each floor of the Jefferson Building.
 - 1. The Work includes full HVAC Renovation, plumbing riser and fixture replacement, fire alarm replacement, cubicle replacement or refurbishment in open areas and enclosed rooms as necessary, electrical power and low voltage to furniture, lighting and ADA Bathroom updates, carpeting, paint, power and horizontal data cabling, 13th floor data room decommissioning, lighting, security card access, breakroom modifications and expansions, first floor lobby updates, cafeteria updates (including furniture) and first floor modifications for DESE open office, conference/training center, furniture and new first floor ADA restroom as required by code. No upgrades or modifications to the fire sprinkler system are included in this scope other than sprinkler head modifications due to floor layout.
- D. The Work will be constructed under a single prime contract.

1.3 WORK SEQUENCE

- A. Work required as part of this project shall be performed in the building and on the building grounds while partially occupied. The contractor and subcontractors shall comply with scheduling requirements as outlined in these construction documents.
 - 1. Building hours of operation are Mondays through Fridays 8:00 AM – 5:00 PM.
 - 2. Means of egress for all floors shall be maintained at all times.
 - 3. The contractor shall provide a sequencing plan and gain approval from the Owner before the start of work. Coordinate construction sequence with building occupant location.

- B. General Sequence for Work Phasing: The following is provided for the Contractor's general reference for the Owner's preferred phasing of construction work. Sequence each work area with the Owner's Representative to allow a minimum of two weeks' notice when relocating occupants. The Work shall be conducted in four phases and completed within 1,055 working days from the Notice of Intent. Construction shall begin in the basement and work sequentially up to the 14th floor, with the remaining basement demolition completing the project. The completion of floors needs to be done sequentially from the 1st to the 14th. This will require the construction to be completed in phases based on moving State employees to available swing space within the building.

1. Phase One: Submittals, Mobilization, Swing Space setup, and Basement Construction.

- a. Within ten working days of the Notice of Intent, the contractor shall start submittals with an emphasis on equipment and material with long lead times. The Contractor shall meet with the Consultant and Construction Administrator and identify submittal items with long lead times. Upon approval of a submittal, the Contractor shall place orders and delivery schedules shall be documented. Delivery delays shall include documentation from the supplier, along with how it will affect the construction schedule. The complete submittal process and material procurement timeline shall be listed in the construction schedule and all submittals shall be completed promptly to not delay the project.

The contractor may commence construction upon approval of the construction schedule and the delivery of critical path material and equipment has been confirmed. This phase will include the setup of the swing space on the 9th, 11th, and 13th floors, and the start of demolition and construction in the basement.

2. Phase Two - First Through Fifth Floor Construction:

- a. Move management of staff: Upon completion of the setup of the swing space and the materials are on-site for the Contractor to start construction on floors 1 through 5, the moving of staff to the swing space shall begin. The State will identify the swing space location on the 9th, 11th, and 13th floors that staff will be placed in as well as the final location within the renovated space. (Note that the staff count for each floor is current as of the date of these bid documents and is being provided for reference only. Actual staff counts at the time of the move may vary with an increase or decrease at no cost to the Owner.)

- 1) Basement DESE – Studio (2 staff)
- 2) 1st Floor DESE – Childhood (83 staff)
- 3) 2nd Floor DSS-MMAC should be vacated.
- 4) 3rd Floor DESE – OEQ (24 staff)
- 5) 3rd Floor OA – ITSD for DESE (33 staff)
- 6) 4th Floor DESE – OSE (50 staff)
- 7) 5th Floor DESE – College/Career (56 staff)

- b. Demolition and construction work shall not begin until all staff, office material, and office equipment have been moved from a floor.

- c. Move management of staff to completed spaces:

- 1) A minimum of two weeks' notice will be required when requesting the relocation of interior occupants and or furnishes. As floors are completed and punch list items are addressed, the State would like to take Partial Occupancy of these floors and move staff from the swing space to the renovated space. The Contractor shall coordinate with the State to schedule moves with the State Agencies.

3. Phase Three – Sixth through Ninth Floor Construction:

- a. Move management of staff: As the swing space opens, staff from the following floors shall be moved. The State will identify the swing space location on the 3rd, 11th, and 13th floors where staff will be placed as well as the final location within the renovated space.
 - 1) 6th Floor DESE – Commissioner, ODSM, and OAL (37 staff)
 - 2) 7th Floor DESE – OQS, OEQ (59 staff)
 - 3) 8th Floor DESE – FAS (51 staff)
 - 4) 9th Floor - Vacated
- b. Demolition and construction work shall not begin until all staff, office material, and office equipment have been moved from a floor.
- c. Move management of staff to completed spaces:
 - 1) A minimum of two weeks' notice will be required when requesting the relocation of interior occupants and or furnishes. As floors are completed and punch list items are addressed the State would like to take Partial Occupancy of these floors and move staff from the swing space to the renovated space. The Contractor shall coordinate with the State to schedule moves with the State Agencies.

4. Phase Four – Tenth through Fourteenth Floor Construction, Basement Final Demolition:

- a. Move management of staff: As the swing space opens, staff from the following floors shall be moved.
 - 1) 10th Floor DSS – (45 staff) Move to swing space until the 9th floor is completed. They will then move to the 9th floor when it is completed.
 - 2) 11th Floor – Vacated
 - 3) 12th Floor MVA – (39 staff) Move to 3rd floor swing space.
 - 4) 13th Floor – Vacated
 - 5) 14th Floor DSS – DYS (18 staff) Move to designated DESE floor. Location to be determined.
- b. Demolition and construction work shall not begin until all staff, office material, and office equipment have been moved from a floor.
- c. Move management of staff to completed spaces:
 - 1) A minimum of two weeks' notice will be required when requesting the relocation of interior occupants and or furnishes. As floors are completed and punch list items are addressed, the State would like to take Partial Occupancy of these floors and move staff from the swing space to the

renovated space. The Contractor shall coordinate with the State to schedule moves with the State Agencies.

- d. When all existing mechanical and electrical equipment on the floors has been disconnected, the final demolition of the mechanical and electrical equipment in the basement can begin.

1.4 CONTRACTOR USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises 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.
 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. 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.
- C. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage cause by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1.5 OCCUPANCY REQUIREMENTS

- A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.
- B. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
 1. The Designer will prepare a Certificate of Partial Occupancy for each specific portion of the Work to be occupied prior to substantial completion.
 2. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions for the building.
 3. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions for the building.

1.6 OWNER-FURNISHED PRODUCTS

- A. The Owner will furnish several A/V system Equipment items. Please see E 0.10 for a schedule of items being furnished by the Owner as well as a responsibility matrix for install. The Work includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.
1. The Owner will arrange for and deliver necessary shop drawings, product data, and samples to the Contractor.
 2. The Owner will arrange and pay for delivery of Owner-furnished items according to the contractor's Construction Schedule.
 3. The Contractor is responsible for receiving, unloading and handling Owner furnished items at the site.
 4. Following delivery, the Contractor will inspect items delivered for damage. The Contractor shall not accept damaged items and shall notify the Owner of rejection of damaged items.
 5. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement.
 6. The Owner will arrange for manufacturer's field services and for the delivery of manufacturer's warranties to the appropriate Contractor.
 7. The Contractor shall designate delivery dates of Owner-furnished items in the Contractor's Construction Schedule.
 8. The Contractor shall review shop drawings, product data and samples and return them to the Designer noting discrepancies or problems anticipated in use of the project.
 9. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.

1.7 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011000

SECTION 012100 – ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Weather allowances.
- C. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders for allowances.

1.3 WEATHER ALLOWANCE

- A. Included within the completion period for this project are a specified number of “bad weather” days (see Schedule of Allowances).
- B. The Contractor’s progress schedule shall clearly indicate the bad weather day allowance as an “activity” or “activities”. In the event weather conditions preclude performance of critical work activities for 50% or more of the Contractor’s scheduled workday, that day shall be declared unavailable for work due to weather (a “bad weather” day) and charged against the above allowance. Critical work activities will be determined by review of the Contractor’s current progress schedule.
- C. The Contractor’s Representative and the Construction Representative shall agree monthly on the number of “bad weather” days to be charged against the allowance. This determination will be documented in writing and be signed by the Contractor and the Construction Representatives. If there is a failure to agree on all or part of the “bad weather” days for a particular month, that disagreement shall be noted on this written document and signed by each party’s representative. Failure of the Contractor’s representative to sign the “bad weather” day documentation after it is presented, with or without the notes of disagreement, shall constitute agreement with the “bad weather” day determination contained in that document.

- D. There will be no modification to the time of contract performance due solely to the failure to deplete the “bad weather” day allowance.
- E. Once this allowance is depleted, a no cost Change Order time extension will be executed for “bad weather” days, as defined above, encountered during the remainder of the Project.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, Designer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Designer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Designer from the designated supplier.

1.5 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 [LUMP-SUM] ALLOWANCES

- A. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials [selected by Designer] under allowance shall be included as part of the Contract Sum and not part of the allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- (1) Weather Allowance: Included within the completion period for this Project 15 “bad weather” days.

END OF SECTION 012100

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Bid Form and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates.

1.3 DEFINITIONS

- A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements 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 alternate is the net addition to the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

- B. No additional time will be allowed for alternate work unless the number of work days is so stated on the bid form.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate the Alternate Work into the Project.

- 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

- B. Notification: The award of the Contract will indicate whether alternates have been accepted or rejected.

- C. Execute accepted alternates under the same conditions as other Work of this Contract.

- D. Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: *Plumbing Stack to be replaced in main water wall. This work would include the renovations of several women's restrooms and vanities.*
- B. Alternate No. 2: *Back of House Café. This work involves HVAC upgrades in the back of house cafeteria area as well as HVAC into the main café space. Basic lighting and ACT upgrades in public cafeteria area are not accounted for in this alternate as they are part of the base bid. More extensive ACT and drywall removal and repair will be required in Alternate No. 5.*
- C. Alternate No. 3: *Elevator lobby upgrades of paint and flooring.*
- D. Alternate No. 4: *Lighting at first floor lobby. This alternate is the replacement of the main first floor lobby light fixture.*
- E. Alternate No. 5: *Café Front of house upgrades.*
 - 1. *New flooring, paint for an upgraded look and feel*
 - 2. *New ceiling layout and lighting*
 - 3. *More restricted access to back of house café and less restricted access to general seating*
 - 4. *New Furniture*
- F. Alternate No. 6: *Mailroom – Conference and Workspace*
 - 1. *New office*
 - 2. *New conference room*
 - 3. *New open office work area*
 - 4. *Condensed mailroom space*
 - 5. *Additional HVAC work to support new layout*
 - 6. *Additional Lighting to support new layout*
 - 7. *Additional Data & Electrical to support new layout*
- G. Alternate No. 7: *Add Dimmer Switches to Private Offices*

END OF SECTION 012300

SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 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 include the following:
 - 1. Division 1, Section 012100 "Allowances" for procedural requirements for handling and processing Allowances.
 - 2. Division 1, Section 013115 "Project Management Communications" for administrative requirements for communications.
 - 3. Division 0, Section 007213, Article 3.1 "Acceptable Substitutions" for administrative procedures for handling Requests for Substitutions made after Contract award.
 - 4. Division 0, Section 007213, Article 4.0 "Changes in the Work" for Change Order requirements.

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, the Contractor shall submit a "Request for Information" (RFI) in writing to the Designer. A RFI may only be submitted by the Contractor and shall only be submitted on the RFI forms provided by the Owner. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed. In the RFI, the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- B. Responses to RFI shall be issued within ten (10) working days of receipt of the Request from the Contractor unless the Designer determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Designer, the Designer will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a RFI on a time sensitive activity on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Designer to respond to the request provided that the Designer responds within the ten (10) working days set forth above.
- C. Responses from the Designer will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Document, the Contractor shall give written

notice to the Designer requesting a Change Order for the work. Failure to give such written notice within ten (10) working days, shall waive the Contractor's right to seek additional time or cost under Article 4, "Changes in the Work" of the General Conditions.

1.4 MINOR CHANGES IN THE WORK

- A. Designer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Amount or the Contract Time, on "Designer's Supplemental Instructions" (DSI).

1.5 PROPOSAL REQUESTS

- A. The Designer or Owner Representative will issue a detailed description of proposed Changes in the Work that may require adjustment to the Contract Amount or the Contract Time. The proposed Change Description will be issued using the "Request for Proposal" (RFP) form. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by the Designer or Owner Representative are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within ten (10) working days after receipt of Proposal Request, submit a proposal for the cost adjustments to the Contract Amount and the Contract Time necessary to execute the Change. The Contractor shall submit his proposal on the appropriate Change Order Detailed Breakdown form. Subcontractors may use the appropriate Change Order Detailed Breakdown form or submit their proposal on their letterhead provided the same level of detail is included. All proposals shall include:
 - a. A detailed breakdown of costs per Article 4.1 of the General Conditions.
 - b. If requesting additional time per Article 4.2 of the General Conditions, include an updated Contractor's Construction Schedule that indicates the effect of the Change including, but not limited to, changes in activity duration, start and finish times, and activity relationship.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, the Designer or Owner Representative will issue a Change Order for signatures of Owner and Contractor on the "Change Order" form.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 013100 – COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Projects including, but not limited to, the following:
 - 1. Coordination Drawings.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
- B. Each Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific Contractor.
- C. Related Sections include the following:
 - 1. Division 1, Section 013200 "Schedules" for preparing and submitting Contractor's Construction Schedule.
 - 2. Articles 1.8.B and 1.8.C of Section 007213 "General Conditions" for coordinating meetings onsite.
 - 3. Article 5.4.H of Section 007213 "General Conditions" for coordinating Closeout of the Contract.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections, which depend on each other for proper installation, connection, and operation.
- B. Coordination: Each Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in 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 with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components including mechanical and electrical.
- C. Prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate Contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Startup and adjustment of systems.
 8. Project Closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
- B. Key Personnel Names: Within fifteen (15) work days of starting construction operations, submit a list of key personnel assignments including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 PROJECT MEETINGS

- A. The Owner's Construction Representative will schedule a Pre-Construction Meeting prior to beginning of construction. The date, time, and exact place of this meeting will be determined after Contract Award and notification of all interested parties. The Contractor shall arrange to have the Job Superintendent and all prime Subcontractors present at the meeting. During the Pre-Construction Meeting, the construction procedures and information necessary for submitting payment requests will be discussed and materials distributed along with any other pertinent information.
1. Minutes: Designer will record and distribute meeting minutes.
- B. Progress Meetings: The Owner's Construction Representative will conduct Monthly Progress Meetings as stated in Articles 1.8.B and 1.8.C of Section 007213 "General Conditions".
1. Minutes: Designer will record and distribute to Contractor the meeting minutes.
- C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: 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. Advise Designer and Construction Representative of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration including requirements for the following:
 - a. Contract Documents
 - b. Options
 - c. Related RFIs
 - d. Related Change Orders
 - e. Purchases
 - f. Deliveries
 - g. Submittals
 - h. Review of mockups
 - i. Possible conflicts
 - j. Compatibility problems
 - k. Time schedules
 - l. Weather limitations
 - m. Manufacturer's written recommendations
 - n. Warranty requirements
 - o. Compatibility of materials

- p. Acceptability of substrates
 - q. Temporary facilities and controls
 - r. Space and access limitations
 - s. Regulations of authorities having jurisdiction
 - t. Testing and inspecting requirements
 - u. Installation procedures
 - v. Coordination with other Work
 - w. Required performance results
 - x. Protection of adjacent Work
 - y. Protection of construction and personnel
3. Contractor shall record significant conference discussions, agreements, and disagreements including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
 6. Revise paragraph below if Project requires holding progress meetings at different intervals. Insert special intervals such as "every third Tuesday" to suit special circumstances.
 7. Project name
 8. Name and address of Contractor
 9. Name and address of Designer
 10. RFI number including RFIs that were dropped and not submitted
 11. RFI description
 12. Date the RFI was submitted
 13. Date Designer's response was received
 14. Identification of related DSI or Proposal Request, as appropriate

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013115 - PROJECT MANAGEMENT COMMUNICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.
- B. Division 1, Section 013300 - Submittals
- C. Division 1, Section 012600 – Contract Modification Procedures

1.2 SUMMARY

- A. Project Management Communications: The Contractor shall use the Internet web based project management communications tool, E-Builder[®] ASP software, and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.
 - 1. Project management communications is available through E-Builder[®] as provided by "e-Builder[®]" in the form and manner required by the Owner.
 - 2. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited
- B. Support: E-Builder[®] will provide on-going support through on-line help files.
- C. Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.
- D. Purpose: The intent of using E-Builder[®] is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files
- E. Authorized Users: Access to the web site will be by individuals who are authorized users.
 - 1. Individuals shall complete the E-Builder New Company/User Request Form located at the following web site: <https://oa.mo.gov/facilities/vendor-links/contractor-forms>.

Completed forms shall be emailed to the following email address: OA.FMDCE-BuilderSupport@oa.mo.gov.

2. Authorized users will be contacted directly and assigned a temporary user password.
 3. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.
- F. Administrative Users: Administrative users have access and control of user licenses and all posted items. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!** Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).
- G. Communications: The use of fax, email and courier communication for this project is discouraged in favor of using E-Builder® to send messages. Communication functions are as follows:
1. Document Integrity and Revisions:
 - a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
 - b. The system shall make it easy to identify revised or superseded documents and their predecessors.
 - c. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
 2. Document Security:
 - a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties communication except for Administrative Users. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!**
 3. Document Integration:
 - a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.
 4. Reporting:
 - a. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.
 5. Notifications and Distribution:
 - a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be

- accomplished by secure email of outgoing documents and attachments, readable by a standard email client.
6. Required Document Types:
 - a. RFI, Request for Information.
 - b. Submittals, including record numbering by drawing and specification section.
 - c. Transmittals, including record of documents and materials delivered in hard copy.
 - d. Meeting Minutes.
 - e. Application for Payments (Draft or Pencil).
 - f. Review Comments.
 - g. Field Reports.
 - h. Construction Photographs.
 - i. Drawings.
 - j. Supplemental Sketches.
 - k. Schedules.
 - l. Specifications.
 - m. Request for Proposals
 - n. Designer's Supplemental Instructions
 - o. Punch Lists
- H. Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 8½ x 11 inches), all other 8½ x 11 inches documents shall be submitted by transmission in electronic form to the E-Builder® web site by licensed users.
- a. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier shall respond to documents received in electronic form on the web site, and consider them as if received in paper document form.
 - b. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.
 - c. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall copy any paper document into electronic form and make same available on the web site.
- I. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier required to have a user license(s) shall be responsible for the following:

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1. Providing suitable computer systems for each licensed user at the users normal work location¹ with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.
2. Each of the above referenced computer systems shall have the following minimum system² and software requirements:
 - a. Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.)
 - 1) Operating System: Windows XP or newer
 - 2) Internet Browser: Internet Explorer 6.01SP2+ (Recommend IE7.0+)
 - 3) Minimum Recommend Connection Speed: 256K or above
 - 4) Processor Speed: 1 Gigahertz and above
 - 5) RAM: 512 mb
 - 6) Operating system and software shall be properly licensed.
 - 7) Internet Explorer version 7 (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.
 - 8) Adobe Acrobat Reader (current version is a free distribution for download).
 - 9) Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable.)

END OF SECTION 013115

¹ The normal work location is the place where the user is assigned for more than one-half of his time working on this project.

² The minimum system herein will not be sufficient for many tasks and may not be able to process all documents and files stored in the E-Builder® Documents area.

SECTION 013200.10 – SCHEDULES – CRITICAL PATH METHOD (CPM)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 CONSTRUCTION PROGRESS SCHEDULE – CRITICAL PATH METHOD (CPM)

- A. This Section includes administrative and procedural requirements for the Critical Path Method (CPM) of scheduling and reporting progress of the Work.
 - 1. Refer to the General Conditions and the Agreement for definitions and specified dates of Contract Time.
 - 2. Due to the scheduling sensitivity of this Project and the need for the Owner to closely monitor all levels of activity, the following personnel and reporting requirements are mandatory.
- B. CPM Definitions
 - 1. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.
 - 2. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall project duration.
 - 3. Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.
 - 4. Activity: A discrete part of a project than can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - a. Critical activities are activities on the critical path.
 - b. Predecessor activity is an activity that must be completed before a given activity can be started.
 - 5. Event: An event is the starting or ending point of an activity.
 - 6. Milestone: A key or critical point in time for reference or measurement.
 - 7. Float or Slack Time: The measure of leeway in activity performance. Accumulative float time is not for the exclusive use or benefit of the Owner or Contractor, but is a project resource available to both parties as needed to meet contract milestones and the completion date.
 - a. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 - b. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.

8. Inclement Weather: Adverse weather conditions affecting the critical path.

C. CPM Quality Assurance

1. The Owner's Consultant shall assist in planning, evaluating, and reporting by CPM Scheduling.
2. The Contractor is responsible for developing its own schedule logic and activities with appropriate duration, restraints and relationships. All information must be acceptable and compatible with the Owner's needs. All target, completion, and milestone dates generated must be acceptable to the Owner and meet the requirements of the Contract Documents including the Statement of Work in the Agreement.
3. The Owner reserves the right to reject any schedule or report that fails to reflect timely completion of the Project, or any intermediate milestone, or otherwise indicates unrealistic performance. Failure of the Contractor to deliver satisfactory schedules or reports to the Owner may result in temporary suspension of progress payments at the Owner's sole discretion.

1.3 PROJECT INSPECTION

- A. The Owner will designate the time for a regular monthly update inspection at which time representatives of the Owner, Designer, and Contractor will inspect the Project and agree on progress of all activities. The information so obtained may be the basis for the Contractor's monthly schedule update.

1.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site
 2. List of separate contractors at Project site
 3. Approximate count of personnel at Project site
 4. Equipment at Project site
 5. Material deliveries
 6. High and low temperatures and general weather conditions
 7. Accidents
 8. Meetings and significant decisions
 9. Unusual events (refer to special reports)
 10. Stoppages, delays, shortages, and losses
 11. Meter readings and similar recordings
 12. Emergency procedures
 13. Orders and requests of authorities having jurisdiction
 14. Change Orders received and implemented
 15. Services connected and disconnected

16. Equipment or system tests and startups
17. Partial Completions and Occupancies
18. Substantial Completions authorized

PART 2 - PRODUCTS

2.1 HARDWARE – Reserved

2.2 CPM SCHEDULING SOFTWARE

- A. The Contractor will use Primavera Project Planner (P6) or other approved scheduling software.

2.3 CPM SCHEDULING PERSONNEL

- A. The Contractor is to designate a person who will have all scheduling responsibilities for this Work. That individual must have had previous scheduling responsibilities on similar construction projects. The Contractor shall submit the resume of the designated person for approval by Owner prior to the Notice to Proceed.
- B. The Owner will designate the time and location for regular Monthly Progress Meetings. The Contractor is required to attend these Meetings. Current schedule, job progress, delays, projections, problem issues, alternatives, and applications for payment will be among the priority items addressed in detail at these meetings.

PART 3 - EXECUTION

3.1 CONSTRUCTION PROGRESS SCHEDULE – CRITICAL PATH METHOD (CPM)

- A. Preliminary Schedule:
 1. The Contractor's Preliminary CPM Schedule including Schedule of Values shall be submitted before the first pay application is approved. The preliminary network diagram shall outline activities for the first (60) days of construction. Include a skeleton diagram for the remainder of the Work with the preliminary diagram. This schedule will be the basis for pay applications for the first (60) days.
 - a. Include each significant construction activity. Coordinate each activity in the network with other activities. Schedule each construction activity in proper sequence.
 - b. Include an activity showing the contract weather allowance time – if any.
 - c. Indicate completion of the Work on the date established for Substantial Completion.
 - d. A tabular activity list.
 - e. In addition to submitting paper copies of schedule reports, updates, and plots, the Contractor shall submit all diskettes containing all required schedule information.

2. Cash Requirement Prediction: With submittal of the preliminary network diagram, include a preliminary cash requirement prediction based on indicated activities.
3. Distribution: Distribute the preliminary network diagram to parties involved in construction activities that are scheduled early, including the Designer and the Owner.

B. Schedule Submittals:

1. In preparing the CPM Schedule, the Contractor shall include procurement, submittal, approval, fabrication, and delivery activities for review and approval by the Owner.
2. Submittal and Distribution: Submit (3) copies of the initial issue of the tabulations and network for acceptance. When authorized, distribute copies to the Designer, Owner's CPM Consultant, and the Owner, separate Contractors, subcontractors, and suppliers or fabricators, and others identified by the Contractor with a need-to-know schedule responsibility.
 - a. Post copies in the Project meeting rooms and temporary field offices.
 - b. When revisions are made, distribute updated schedules 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 the performance of construction activities.
 - c. Submit copies of each computer-produced report to the Designer.
3. Schedule Updating: Revise the Schedule within five (5) working days after each meeting or other activity, where revisions have been recognized or made. Issue the updated Schedule concurrently with the report of each project meeting.
 - a. Weekly: On a weekly basis, the current detailed construction schedule (Three Week Look Ahead Schedule) shall be provided by the Contractor, at the request of the Owner. This information shall include a brief written report describing activities begun or finished, during the preceding week and a projection of all activities to be started or finished in the next three weeks.
 - b. Monthly: Each month, the Contractor shall provide current, detailed construction schedule information consisting of certified tabular data and summaries, which show all changes to the schedule which have occurred since the previous submission of schedule information and indicates progress of each activity and shown completion dates. The submittal shall include major changes in scope, logic changes, activities modified since previous update, identification of any slippage, revised projections due to changes, out-of-sequence progress, and other identifiable changes.
4. In the event a revised detailed schedule is not acceptable to the Owner, the Schedule shall be revised within five (5) working days by the Contractor until it is found acceptable by the Owner.
5. The Contractor shall submit an updated schedule to CPM Consultant a minimum of five (5) working days prior to the scheduled Monthly Progress Meeting.

6. In the event that the Contractor fails to provide the required Schedules, reports, or updates noted above, in a timely manner, the Owner shall have the right to withhold all progress payments until such time as acceptable scheduling documentation is received.
7. Following each update, the Contractor shall distribute copies of the updated schedule to subcontractors, designer, and Owner.

C. Schedule Requirements:

1. Within (30) days after approval of the proposed preliminary network diagram, the Contractor shall submit draft of proposed complete network diagram for review. Upon request, include written certification that major subcontractors have reviewed and accepted the proposed schedule.
2. Within (15) days after joint review of proposed complete network diagram, submit final complete network diagram. The Owner anticipates a final base line schedule acceptable to the CPM Consultant within (90) days from Contractor's Notice to Proceed.
3. All relevant data is to be acquired and processed and reports prepared and submitted by the person designated to be responsible for the Project Schedule.
4. The scheduled logic for the Work shall be developed by the Contractor and approved by the Owner, along with established duration for each activity. Activity numbers shall be based on a reasonable, rational system for identification purposes. As a minimum, along with the activity numbers, include the building/area and type of work by trade and subcontractor company activity codes.
5. Participate in joint review and evaluation of network diagrams and analysis with Owner, Owner's CPM Consultant, and Designer at each submittal above.
 - a. Following joint review of the final completion network diagram, distribute copies of the schedule to subcontractors, suppliers, designer, and Owner.
6. The detailed construction schedule submitted by the Contractor shall reflect complete sequence of construction by activity including:
 - a. Procurement and delivery dates for long lead items
 - b. Contractual milestone dates
 - c. Dates for beginning and completion of each element of construction
 - d. Disruptions and shutdowns due to other operations, facilities, functions, or testing agencies' activities
 - e. Planned periods of inactivity on the project
 - f. Anticipated periods of overtime or shift work
 - g. Dates for installation and testing of all equipment
 - h. Cleanup
 - i. Contract startup and closeout

7. Identify work for separate buildings or areas and other logically grouped activities.
8. The schedule is to show projected percentage of completion for each item of work as of the last day of each month. Each item of work shall be cost loaded.
9. Provide special schedules to define critical portions of the entire schedule as requested by Owner.
10. Incorporate the procurement submittal schedule.
 - a. Discrete activities shall be separated by trade or other category as requested by the Owner and separate activities shall be assigned activity numbers for use and monitoring.
 - b. Separate activities shall be reflected in a level of detail such that no activity shall be of greater duration than (15) days. Specific exceptions must be requested in writing.
11. Provide recovery plan to complete the project within the contract completion time as requested by Owner.
12. The schedule activities shall be cost loaded per the schedule of values and will be used as the basis for the Contractor's monthly pay applications including:
 - a. Milestone and zero duration activities shall not be dollar loaded.
 - b. The dollar value for each activity will be the cost including labor, materials, equipment, and pro rata contribution to overhead and profit. The Contractor shall make the sum of all activity costs equal to the total Contract sum.
 - c. The Contractor shall provide a "General Conditions" activity which shall include all Contractor jobsite costs. This activity cost shall be distributed evenly for the entire duration of the Contract. The Contractor shall furnish a detailed listing to the Owner of the items and their associated costs included in this activity.
 - d. Separate activities should be shown for mobilization and demobilization. These should be equal cost amounts.
 - e. "Front-end" dollar loading of construction activities will not be allowed.
13. Change Orders that extend the Contract Completion Date shall be shown as a new activity. This schedule impact shall be submitted with the Change Order proposal showing float used and/or impact on the critical path.
14. If a Change Order results in a compensable time extension, the daily General Condition rate defined above will be used. It will be added to the Change Order and will be excluded from overhead and profit markup as allowed by the General Conditions.
 - a. Any additional General Condition monies associated with the approved additional time will be added on a daily basis to the end of the project. The additional time granted per the change order shall also be added to the end of the latest approved contract completion date. These additional General Condition monies shall be held by the Owner and not paid to the Contractor until the project's original contract time has been exceeded.

- b. If the Owner grants the Contractor Substantial Completion prior to the most current Contract Completion date, then for any and all contract days remaining beyond the date of Substantial Completion, the Contractor and Owner shall share on a 50% - 50% basis, all previously approved extended daily General Conditions costs.
- c. If the change warrants a reduction in contract time, for any reason, then the Owner shall deduct as part of the change 50% of the applicable pro rata share of the General Conditions monies as shown in the Schedule of Values.

D. Reporting:

- 1. Contractor reports shall include monthly updates, and as requested by Owner, revised network logic diagrams, and activity lists. The monthly updates may be accompanied by certificates that all data submitted is complete and current (See sample at end of this Section).
- 2. Contractor network diagrams shall legibly show the order and interdependence of activities, and the sequence in which the work is to be accomplished as planned by the Contractor. Networks shall be drawn on 24" by 36" or 11" by 17" sized sheets, as directed by Owner, with title, match data, and date of latest version on each sheet.
- 3. Tabular Activity Lists shall be provided and shall show one activity per line along with appropriate data for the purpose intended including various combinations of the following:
 - a. Activity ID number
 - b. Activity description
 - c. Preceding and succeeding activities and descriptions
 - d. Original duration (in working days)
 - e. Remaining duration (in working days)
 - f. Percent complete
 - g. Earliest start date (by calendar date)
 - h. Earliest finish date (by calendar date)
 - i. Latest start date (by calendar date)
 - j. Latest finish date (by calendar date)
- 4. Narrative: A written narrative shall be required by Owner under the following circumstances:
 - a. Added, deleted, or changed activities including logic and budget changes
 - b. To explain out-of-sequence progress
 - c. To detail procurement/delivery problems
 - d. To describe recovery plans, if the Contractor fails to maintain its schedule

- e. To explain any schedule item which requires clarification as directed by the Owner

3.2 SCHEDULE OF SUBMITTALS

- A. Tabulation of Submittals: With submittal of the preliminary network diagram, include a tabulation by date of submittals required during the first (90) days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead-time for manufacture or fabrication.
- B. Upon acceptance of the CPM Construction Progress Schedule, prepare, and submit a complete schedule of submittals. Coordinate the submittal schedule with Section 013300 SUBMITTALS, the approved Construction Progress Schedule, list of subcontracts, Schedule of Values and the list of products.
- C. Prepare the schedule in chronological order. Provide the following information:
 - 1. Scheduled date for the first submittal
 - 2. Related Section number
 - 3. Submittal category
 - 4. Name of the subcontractor
 - 5. Description of the part of the Work covered
 - 6. Scheduled date for resubmittal
 - 7. Scheduled date for the Designer's final release or approval
- D. Distribution: Following the Designer's response to the initial submittal schedule, print, and distribute copies to the Designer, Owner, Subcontractors, and other parties required to comply with submittal dates indicated.
 - 1. Post copies in the Project meeting room and temporary field office.
 - 2. 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 part of the Work and are no longer involved in construction activities.
- E. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

3.3 SCHEDULE OF INSPECTIONS AND TESTS

- A. Upon acceptance of the CPM Construction Progress Schedule, prepare and submit within (15) working days a complete schedule of inspections, tests, and similar services required by the Contract Documents.
- B. Form: The schedule shall be in tabular form and shall include, but not be limited to, the following:
 - 1. Specification Section number
 - 2. Description of the test

3. Identification of applicable standards
 4. Identification of test methods
 5. Number of tests required
 6. Time schedule or time span for tests
 7. Entity responsible for performing tests
 8. Requirements for taking samples
 9. Unique characteristics of each service
- C. Distribution: Distribute the schedule to the Owner, Designer, and each party involved in performance of portions of the Work where inspections and tests are required.

3.4 SUBMITTAL PROCEDURES

A. The Contractor shall submit to the Designer, within ten (10) working days following the Notice to Proceed, a Progress Schedule including Schedule of Values showing the rate of progress the Contractor agrees to maintain and the order in which he proposed to carry out the various phases of Work. No payments shall be made to the Contractor until the Progress Schedule has been approved by the Owner.

1. The Schedule of Values must have the following line items included with the value of the item as indicated below:
 - a. O&M's (Owner's Manual)
 - 1) \$1,000,000.00 (One million) and under – 2% of the total contract amount
 - 2) Over \$1,000,000.00 (One million) – 1% of the total contract amount
 - b. Close Out Documents
 - 1) \$1,000,000.00 (One million) and under – 2% of the total contract amount
 - 2) Over \$1,000,000.00 (One million) – 1% of the total contract amount
 - c. General Conditions
 - 1) No more than 10%

END OF SECTION 013200.10

SECTION 013300 – SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.
- B. Division 1, Section 013115 “Project Management Communications” for administrative requirements for communications.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work including the following:
 - 1. Shop Drawings
 - 2. Product Data
 - 3. Samples
 - 4. Quality Assurance Submittals
 - 5. Construction Photographs
 - 6. Operating and Maintenance Manuals
 - 7. Warranties
- B. Administrative Submittals: Refer to General and Supplementary Conditions other applicable Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
 - 1. Construction Progress Schedule including Schedule of Values
 - 2. Performance and Payment Bonds
 - 3. Insurance Certificates
 - 4. Applications for Payment
 - 5. Certified Payroll Reports
 - 6. Partial and Final Receipt of Payment and Release Forms
 - 7. Affidavit – Compliance with Prevailing Wage Law
 - 8. Record Drawings
 - 9. Notifications, Permits, etc.
- C. The Contractor is obliged and responsible to check all shop drawings and schedules to assure compliance with contract plans and specifications. The Contractor is responsible for the content of the shop drawings and coordination with other contract work. Shop drawings and schedules shall indicate, in detail, all parts of an Item or Work including erection and setting instructions and integration with the Work of other trades.

- D. The Contractor shall at all times make a copy, of all approved submittals, available on site to the Construction Representative.

1.3 SUBMITTAL PROCEDURES

- A. The Contractor shall comply with the General and Supplementary Conditions and other applicable sections of the Contract Documents. The Contractor shall submit, with such promptness as to cause no delay in his work or in that of any other contractors, all required submittals indicated in Part 3.1 of this section and elsewhere in the Contract Documents. 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 Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- B. Each drawing and/or series of drawings submitted must be accompanied by a letter of transmittal giving a list of the titles and numbers of the drawings. Each series shall be numbered consecutively for ready reference and each drawing shall be marked with the following information:
 - 1. Date of Submission
 - 2. Name of Project
 - 3. Location
 - 4. Section Number of Specification
 - 5. State Project Number
 - 6. Name of Submitting Contractor
 - 7. Name of Subcontractor
 - 8. Indicate if Item is submitted as specified or as a substitution

1.4 SHOP DRAWINGS

- A. Comply with the General Conditions, Article 3.2.
- B. The Contractor shall 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.
- C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings including 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 8½”x11” but no larger than 36”x48”.

1.5 PRODUCT DATA

- A. The Contractor shall comply with the General Conditions, Article 3.2.
- B. The Contractor shall collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, 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 including 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.

1.6 SAMPLES

- A. The Contractor shall comply with the General Conditions, Article 3.2.
- B. The Contractor shall 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. The Contractor shall mount or display samples in the manner to facilitate review of qualities indicated. Prepare samples to match the Designer’s sample including 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. The Contractor shall 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. Field samples are full-size examples erected onsite to illustrate finishes, coatings, or finish materials and to establish the Project standard.
- a. The Contractor shall comply with submittal requirements to the fullest extent possible. The Contractor shall process transmittal forms to provide a record of activity.

1.7 QUALITY ASSURANCE DOCUMENTS

- A. The Contractor shall comply with the General Conditions, Article 3.2
- B. The Contractor shall 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.
- C. 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 contractually bind the Company.
- D. Inspection and Test Reports: The Contractor shall submit the required inspection and test reports from independent testing agencies as specified in this Section and in other Sections of the Contract Documents.
- E. Construction Photographs: The Contractor shall submit record construction photographs as specified in this Section and in other Sections of the Contract Documents.

1. The Contractor shall submit digital photographs. The Construction Administrator shall determine the quantity and naming convention at the preconstruction meeting.
2. The Contractor shall identify each photograph with project name, location, number, date, time, and orientation.
3. The Contractor shall submit progress photographs monthly unless specified otherwise. Photographs shall be taken one (1) week prior to submitting.
4. The Contractor shall take four (4) site photographs from differing directions and a minimum of five (5) interior photographs indicating the relative progress of the Work.

1.8 OPERATING AND MAINTENANCE MANUALS AND WARRANTIES

- A. The Contractor shall submit all required manufacturer’s operating instructions, maintenance/service manuals, and warranties in accordance with the General Conditions, Article 3.5, and Supplementary Conditions along with this and other Sections of the Contract Documents.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REQUIRED SUBMITTALS

- A. Contractor shall submit the following information for materials and equipment to be provided under this contract.

SPEC SECTION	TITLE	CATEGORY
013200	Schedules	Construction Schedule
013200	Schedules	Schedule of Values
013200	Schedules	List of Subcontractors
013200	Schedules	Major Material Suppliers
024119	Selective Demolition	Warranty
030130	Maintenance of Cast-In-Place Concrete	Product Data
030130	Maintenance of Cast-In-Place Concrete	Sample
040110	Masonry Cleaning	Product Data
061000	Rough Carpentry	Certification
064116	Plastic-Laminate-Clad Architectural Cabinets	Product Data
064116	Plastic-Laminate-Clad Architectural Cabinets	Shop Drawings

064116	Plastic-Laminate-Clad Architectural Cabinets	Sample
070150.19	Preparation For Roofing	Product Data
072100	Thermal Insulation	Product Data
072100	Thermal Insulation	Test Report
075216	Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing	Product Data
075216	Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing	Shop Drawings
075216	Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing	Sample
075216	Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing	Test Report
075323	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing	Product Data
075323	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing	Shop Drawings
075323	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing	Sample
075323	Ethylene-Propylene-Diene-Monomer (EPDM) Roofing	Test Report
075423	Thermoplastic-Polyolefin (TPO) Roofing	Product Data
075423	Thermoplastic-Polyolefin (TPO) Roofing	Shop Drawings
075423	Thermoplastic-Polyolefin (TPO) Roofing	Sample
075423	Thermoplastic-Polyolefin (TPO) Roofing	Test Report
078413	Penetration Firestopping	Product Data
079200	Joint Sealants	Product Data
079200	Joint Sealants	Sample
079219	Acoustical Joint Sealants	Product Data
079219	Acoustical Joint Sealants	Sample
079219	Acoustical Joint Sealants	Warranty
081213	Hollow Metal Frames	Product Data
081213	Hollow Metal Frames	Shop Drawings
081213	Hollow Metal Frames	Sample
081416	Flush Wood Doors	Product Data
081416	Flush Wood Doors	Shop Drawings
081416	Flush Wood Doors	Sample
081416	Flush Wood Doors	Warranty
083113	Access Doors And Frames	Product Data
083113	Access Doors And Frames	Sample
083113	Access Doors And Frames	Test Report
084213	Aluminum-Framed Entrances	Product Data

084213	Aluminum-Framed Entrances	Shop Drawings
084213	Aluminum-Framed Entrances	Sample
084213	Aluminum-Framed Entrances	Certification
084213	Aluminum-Framed Entrances	Operation / Maintenance Manual
087111	Door Hardware (Descriptive Specification)	Product Data
087111	Door Hardware (Descriptive Specification)	Sample
087113	Power Door Operators	Product Data
087113	Power Door Operators	Shop Drawings
087113	Power Door Operators	Operation / Maintenance Manual
087113	Power Door Operators	Warranty
088000	Glazing	Product Data
088000	Glazing	Certification
090190.52	Maintenance Repainting	Product Data
090190.52	Maintenance Repainting	Sample
090561	Common Work Results For Flooring Preparation	Product Data
090561	Common Work Results For Flooring Preparation	Test Report
092216	Non-Structural Metal Framing	Product Data
092900	Gypsum Board	Product Data
092900	Gypsum Board	Sample
092900	Gypsum Board	Test Report
093013	Ceramic Tiling	Product Data
093013	Ceramic Tiling	Shop Drawings
093013	Ceramic Tiling	Sample
095123	Acoustical Tile Ceilings	Product Data
095123	Acoustical Tile Ceilings	Sample
096363	Terrazzo Cleaning	Product Data
096363	Terrazzo Cleaning	Mock up
096400	Terrazzo Repair	Product Data
096400	Terrazzo Repair	Mock up
096513	Resilient Base And Accessories	Product Data
096513	Resilient Base And Accessories	Sample
096519	Resilient Tile Flooring	Product Data
096519	Resilient Tile Flooring	Sample
096519	Resilient Tile Flooring	Operation / Maintenance Manual
096813	Tile Carpeting	Product Data
096813	Tile Carpeting	Shop Drawings
096813	Tile Carpeting	Sample

096813	Tile Carpeting	Operation / Maintenance Manual
097200	Prefinished Gypsum Board	Product Data
097200	Prefinished Gypsum Board	Sample
099123	Interior Painting	Product Data
099123	Interior Painting	Sample
102113.13	Metal Toilet Compartments	Product Data
102113.13	Metal Toilet Compartments	Shop Drawings
102113.13	Metal Toilet Compartments	Sample
102113.13	Metal Toilet Compartments	Operation / Maintenance Manual
102219	Demountable Partitions	Shop Drawings
102219	Demountable Partitions	Test Report
102219	Demountable Partitions	Operation / Maintenance Manual
102239	Folding Panel Partitions	Product Data
102239	Folding Panel Partitions	Shop Drawings
102239	Folding Panel Partitions	Sample
102239	Folding Panel Partitions	Test Report
102239	Folding Panel Partitions	Certification
102239	Folding Panel Partitions	Operation / Maintenance Manual
102600	Wall And Door Protection	Product Data
102600	Wall And Door Protection	Shop Drawings
102600	Wall And Door Protection	Sample
104413	Fire Protection Cabinets	Product Data
104416	Fire Extinguishers	Product Data
122113	Horizontal Louver Blinds	Product Data
122113	Horizontal Louver Blinds	Shop Drawings
122113	Horizontal Louver Blinds	Sample
122113	Horizontal Louver Blinds	Operation / Maintenance Manual
122413	Roller Window Shades	Product Data
122413	Roller Window Shades	Shop Drawings
122413	Roller Window Shades	Sample
122413	Roller Window Shades	Operation / Maintenance Manual
123623.13	Plastic-Laminate-Clad Countertops	Product Data
123623.13	Plastic-Laminate-Clad Countertops	Shop Drawings
123623.13	Plastic-Laminate-Clad Countertops	Sample

123623.13	Plastic-Laminate-Clad Countertops	Test Report
125100	Freestanding Office Furniture Demo & Installation	Certification
125420	Freestanding Hospitality (Café) Furniture Demo & Installation	Certification
125900	Systems Furniture Installation	Certification
126400	Wall Bench (Café) Specification & Installation	Product Data
126400	Wall Bench (Café) Specification & Installation	Shop Drawings
126400	Wall Bench (Café) Specification & Installation	Sample
126400	Wall Bench (Café) Specification & Installation	Certification
200800	Seismic Protection	Shop Drawings
211000	Water Based Fire-Suppression Systems	Shop Drawings
220500	Basic Plumbing Materials and Methods	Shop Drawings
220523	Valves	Shop Drawings
220519	Hangers and Supports for Plumbing Equipment	Shop Drawings
220553	Identification for Plumbing Piping and Equipement	Shop Drawings
220700	Plumbing Insulation	Shop Drawings
221116	Domestic Water Piping	Shop Drawings
221119	Domestic Water Piping Specialties	Shop Drawings
221123.13	Domestic Water Packaged Booster Pump	Shop Drawings
221319	Sanitary Waste Piping Specialties	Shop Drawings
221413	Storm Drainage Piping	Shop Drawings
224300	Plumbing Fixtures	Shop Drawings
230500	Basic Mechanical Materials and Methods	Shop Drawings
230519	Meters and Gauges	Shop Drawings
230523	Valves	Shop Drawings
230529	Hangers and Supports	Shop Drawings
230548.13	Vibration Controls For HVAC	Shop Drawings
230553	Identification for HVAC Piing and Equipment	Shop Drawings
230566	Antimicrobial Ultraviolet Lamp System	Shop Drawings
230593	Testing, Adjusting, and Balancing	Test Report
230700	Mechanical Insulation	Shop Drawings
230900	Controls Systems	Shop Drawings
232123	Hydronic Pumps	Shop Drawings
232213	Steam and Condensate Piping	Shop Drawings
232216	Steam and Condensate Heating Piping Specialties	Shop Drawings
232513	Water Treatment for hydronic systems	Shop Drawings

233113	Metal Ducts	Shop Drawings
233300	Duct Accessories	Shop Drawings
233423	Fans and Ventilators	Shop Drawings
233600	Air Terminal Units	Shop Drawings
233713	Diffusers Registers and Grilles	Shop Drawings
233813	Commercial- Kitchen Hood	Shop Drawings
234100	Particulate Air Filtration	Shop Drawings
235700	Heat Exchangers for HVAC	Shop Drawings
236500	Dry Closed-Circuit Cooler	Shop Drawings
237313	Modular Air Handling Units	Shop Drawings
238123.11	Computer Room Air Conditioner	Shop Drawings
238126	Split System Air Conditioners	Shop Drawings
238239	In Room Terminal Equipment	Shop Drawings
260513	MV Cables	Product Data
260513	MV Cables	Shop Drawings
260513	MV Cables	Certification
260519	LV Electrical Power Conductors	Product Data
260523	Control Voltage Electrical Power Cables	Product Data
260523	Control Voltage Electrical Power Cables	Test Report
260526	Grounding and Bonding	Product Data
260529	Hangers and Supports	Product Data
260529	Hangers and Supports	Shop Drawings
260533.13	Conduits for Electrical Systems	Product Data
260533.16	Boxes and Covers for Electrical Systems	Product Data
260533.16	Boxes and Covers for Electrical Systems	Shop Drawings
260544	Sleeves and Sleeve Seals	Product Data
260548	Vibration and Seismic Controls	Product Data
260548	Vibration and Seismic Controls	Shop Drawings
260548	Vibration and Seismic Controls	Test Report
260553	Identification for Electrical Systems	Product Data
260553	Identification for Electrical Systems	Construction Schedule
260573.13	Short Circuit Study	Product Data
260573.13	Short Circuit Study	Test Report
260573.16	Coordination Study	Product Data
260573.16	Coordination Study	Test Report
260573.19	Arc-Flash Hazard Analysis	Product Data
260573.19	Arc-Flash Hazard Analysis	Test Report
260923	Lighting Control Devices	Product Data
260923	Lighting Control Devices	Shop Drawings

260923	Lighting Control Devices	Test Report
260943.23	Relay-Based Lighting Controls	Product Data
260943.23	Relay-Based Lighting Controls	Shop Drawings
260943.23	Relay-Based Lighting Controls	Test Report
261216	Dry-Type Medium-Voltage Transformers	Product Data
261216	Dry-Type Medium-Voltage Transformers	Shop Drawings
261323	Medium-Voltage Metal-Enclosed Switchgear	Product Data
261323	Medium-Voltage Metal-Enclosed Switchgear	Shop Drawings
261326	Medium-Voltage Metal-Clad Switchgear	Product Data
261326	Medium-Voltage Metal-Clad Switchgear	Shop Drawings
262213	Low-Voltage Distribution Transformers	Product Data
262213	Low-Voltage Distribution Transformers	Shop Drawings
262413	Switchboards	Product Data
262413	Switchboards	Shop Drawings
262416	Panelboards	Product Data
262416	Panelboards	Shop Drawings
262716	Electrical Cabinets and Enclosures	Product Data
262716	Electrical Cabinets and Enclosures	Shop Drawings
262726	Wiring Devices	Product Data
262813	Fuses	Product Data
262813	Fuses	Operation / Maintenance Manual
262816	Enclosed Switches and Circuit Breakers	Product Data
262816	Enclosed Switches and Circuit Breakers	Shop Drawings
262923	Variable-Frequency Motor Controllers	Product Data
262923	Variable-Frequency Motor Controllers	Shop Drawings
265119	LED Interior Lighting	Product Data
265119	LED Interior Lighting	Shop Drawings
265119	LED Interior Lighting	Operation / Maintenance Manual
265213	Emergency and Exit Lighting	Product Data
265213	Emergency and Exit Lighting	Shop Drawings
265213	Emergency and Exit Lighting	Certification
265213	Emergency and Exit Lighting	Test Report
265213	Emergency and Exit Lighting	Warranty
270526	Grounding and Bonding for Communications Systems	Shop Drawings
270526	Grounding and Bonding for Communications Systems	Test Report

270526	Grounding and Bonding for Communications Systems	As-Builts
270528	Pathways for Communications Systems	Product Data
270528	Pathways for Communications Systems	Shop Drawings
270528	Pathways for Communications Systems	Test Report
270529	Hangers and Supports for Communications Systems	Product Data
270529	Hangers and Supports for Communications Systems	Shop Drawings
270529	Hangers and Supports for Communications Systems	Certification
270544	Sleeves and Sleeve Seals	Product Data
270548	Vibration and Seismic Controls	Product Data
270548	Vibration and Seismic Controls	Shop Drawings
270548	Vibration and Seismic Controls	Certification
270553	Identification for Communications Systems	Product Data
270553	Identification for Communications Systems	Construction Schedule
271100	Communications Equipment Room Fittings	Product Data
271100	Communications Equipment Room Fittings	Shop Drawings
271100	Communications Equipment Room Fittings	Certification
271116	Communications Racks, Frames, and Enclosures	Product Data
271116	Communications Racks, Frames, and Enclosures	Shop Drawings
271116	Communications Racks, Frames, and Enclosures	Certification
271323	Communications Optical Fiber Backbone Cabling	Product Data
271323	Communications Optical Fiber Backbone Cabling	Shop Drawings
271323	Communications Optical Fiber Backbone Cabling	Certification
271323	Communications Optical Fiber Backbone Cabling	Test Report
271323	Communications Optical Fiber Backbone Cabling	Operation / Maintenance Manual
271513	Communications Copper Horizontal Cabling	Product Data
271513	Communications Copper Horizontal Cabling	Shop Drawings
271513	Communications Copper Horizontal Cabling	Test Report
271513	Communications Copper Horizontal Cabling	Operation / Maintenance Manual
274100	Audio Visual Systems	Product Data
274100	Audio Visual Systems	Shop Drawings
274100	Audio Visual Systems	Operation / Maintenance Manual
281400	Access Control System Hardware	Product Data
281400	Access Control System Hardware	Shop Drawings
281400	Access Control System Hardware	Test Report

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281400	Access Control System Hardware	Warranty
284621.11	Addressable Fire-Alarm Systems	Product Data
284621.11	Addressable Fire-Alarm Systems	Shop Drawings
284621.11	Addressable Fire-Alarm Systems	Certification
284621.11	Addressable Fire-Alarm Systems	Test Report
284621.11	Addressable Fire-Alarm Systems	Warranty
284621.11	Addressable Fire-Alarm Systems	Operation / Maintenance Manual

END OF SECTION 013300

SECTION 013513.10 - SITE SECURITY AND HEALTH REQUIREMENTS (OA)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUBMITTALS

- A. List of required submittals:
 - 1. Materials Safety Data Sheets for all hazardous materials to be brought onsite.
 - 2. Schedule of proposed shutdowns, if applicable.
 - 3. A list of the names of all employees who will submit fingerprints for a background check, and the signed privacy documents identified below for each employee.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 ACCESS TO THE SITE

- A. The Contractor shall arrange with Facility Representatives to establish procedures for the controlled entry of workers and materials into the work areas at the Facility.
- B. The Contractor shall establish regular working hours with Facility Representatives. The Contractor must report changes in working hours or overtime to Facility Representatives and obtain approval twenty-four (24) hours ahead of time. The Contractor shall report emergency overtime to Facility Representatives as soon as it is evident that overtime is needed. The Contractor must obtain approval from Facility Representatives for all work performed after dark.
- C. The Contractor shall provide the name and phone number of the Contractor's employee or agent who is in charge onsite; this individual must be able to be contacted in case of emergency. The Contractor must be able to furnish names and address of all employees upon request.
- D. All construction personnel shall visibly display issued identification cards.

3.2 FIRE PROTECTION, SAFETY, AND HEALTH CONTROLS

- A. The Contractor shall take all necessary precautions to guard against and eliminate possible fire hazards.
 - 1. Onsite burning is prohibited.

2. The Contractor shall store all flammable or hazardous materials in proper containers located outside the buildings or offsite, if possible.
 3. The Contractor shall provide and maintain, in good order, during construction fire extinguishers as required by the National Fire Protection Association. In areas of flammable liquids, asphalt, or electrical hazards, 15-pound carbon dioxide or 20-pound dry chemical extinguishers shall be provided.
- B. The Contractor shall not obstruct streets or walks without permission from the Owner's Construction Representative and Facility Representatives.
- C. The Contractor's personnel shall not exceed the speed limit of 15 mph while at the Facility unless otherwise posted.
- D. The Contractor shall take all necessary, reasonable measures to reduce air and water pollution by any material or equipment used during construction. The Contractor shall keep volatile wastes in covered containers, and shall not dispose of volatile wastes or oils in storm or sanitary drains.
- E. The Contractor shall keep the project site neat, orderly, and in a safe condition at all times. The Contractor shall immediately remove all hazardous waste, and shall not allow rubbish to accumulate. The Contractor shall provide onsite containers for collection of rubbish and shall dispose of it at frequent intervals during the progress of the Work.
- F. Fire exits, alarm systems, and sprinkler systems shall remain fully operational at all times, unless written approval is received from the Owner's Construction Representative and the appropriate Facility Representative at least twenty-four (24) hours in advance. The Contractor shall submit a written time schedule for any proposed shutdowns.
- G. For all hazardous materials brought onsite, Material Safety Data Sheets shall be on site and readily available upon request at least a day before delivery.
- H. Alcoholic beverages or illegal substances shall not be brought upon the Facility premises. The Contractor's workers shall not be under the influence of any intoxicating substances while on the Facility premises.

3.3 SECURITY CLEARANCES AND RESTRICTIONS

- A. FMDC CONTRACTOR BACKGROUND AND ID BADGE PROCESS
1. All employees of an OA/FMDC contractor (or subcontractor performing work under an OA/FMDC contract) are required to submit a fingerprint check through the Missouri State Highway Patrol (MSHP) and the FBI enabling OA/FMDC to obtain state and national criminal background checks on the employees, unless stated otherwise in the Contractor's contract.
 2. FMDC reserves the right to prohibit any employee of the Contractor from performing work in or on the premises of any facility owned, operated, or utilized by the State of Missouri for any reason.
 3. The Contractor shall ensure all of its employees submit fingerprints to the Missouri State Highway Patrol and pay for the cost of such background checks. The Contractor shall

submit to FMDC via email to FMDCSecurity@oa.mo.gov a list of the names of the Contractor's employees who will be fingerprinted and a signed OA/FMDC Authorization for Release of Information Confidentiality Oath for each employee. All employees of the Contractor approved by FMDC to work at a State facility must obtain a contractor ID badge from FMDC prior to beginning work on-site, unless the Director of FMDC, at the Director's discretion, waives the requirement for a contractor ID badge. The Contractor and its employees must comply with the process for background checks and contractor ID badges found on FMDC's website at: <https://oa.mo.gov/facilities/facilities-operations/security-information/fmdc-contractor-background-and-id-badge>

4. Fingerprints and Authorization for Release of Information Confidentiality Oath form are valid for one (1) year and must be renewed annually. Changing or adding locations may result in additional required documentation. Certain employees may be required to be fingerprinted more frequently. OA/FMDC reserves the right to request additional background checks at any time for any reason.
5. The Contractor shall notify FMDC via email to FMDCSecurity@oa.mo.gov within 48 hours of anyone severing employment with their company.

3.4 DISRUPTION OF UTILITIES

- A. The Contractor shall give a minimum of seventy-two (72) hours written notice to the Construction Representative and the Facility Representative before disconnecting electric, gas, water, fire protection, or sewer service to any building.
- B. The Contractor shall give a minimum of seventy-two (72) hours written notice to the Construction Representative and Facility Representative before closing any access drives, and shall make temporary access available, if possible. The Contractor shall not obstruct streets, walks, or parking.

3.5 PROTECTION OF PERSONS AND PROPERTY

A. SAFETY PRECAUTIONS AND PROGRAMS

1. The Contractor shall at all times conduct operations under this Contract in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. The Contractor shall promptly take precautions which are necessary and adequate against conditions created during the progress of the Contractor's activities hereunder which involve a risk of bodily harm to persons or a risk of damage to property. The Contractor shall continuously inspect Work, materials, and equipment to discover and determine any such conditions and shall be solely responsible for discovery, determination, and correction of any such conditions. The Contractor shall comply with applicable safety laws, standards, codes, and regulations in the jurisdiction where the Work is being performed, specifically, but without limiting the generality of the foregoing, with rules regulations, and standards adopted pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 and applicable amendments.
2. All contractors, subcontractors and workers on this project are subject to the Construction Safety Training provisions 292.675 RSMo.
3. In the event the Contractor encounters on the site, material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), lead, mercury, or other material known to be

hazardous, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner's Representative and the Architect in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner's Representative and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB), or when it has been rendered harmless by written agreement of the Owner's Representative and the Contractor. "Rendered Harmless" shall mean that levels of such materials are less than any applicable exposure standards, including but limited to OSHA regulations.

B. SAFETY OF PERSONS AND PROPERTY

1. The Contractor shall take reasonable precautions for safety of, and shall provide protection to prevent damage, injury, or loss to:
 - a. clients, staff, the public, construction personnel, and other persons who may be affected thereby;
 - b. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor or the Contractor's Subcontractors of any tier; and
 - c. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
2. The Contractor shall give notices and comply with applicable laws, standards, codes, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.
3. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including, but not limited to, posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.
4. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise the highest degree of care and carry on such activities under supervision of properly qualified personnel.
5. The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in this Section caused in whole or in part by the Contractor, a Subcontractor of any tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable, and for which the Contractor is responsible under this Section, except damage or loss attributable solely to acts or omissions of Owner or the Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's other obligations stated elsewhere in the Contract.
6. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents, and the maintaining, enforcing and supervising of safety precautions and programs. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner's

Representative and Architect. The Contractor shall hold regularly scheduled safety meetings to instruct Contractor personnel on safety practices, accident avoidance and prevention, and the Project Safety Program. The Contractor shall furnish safety equipment and enforce the use of such equipment by its employees and its subcontractors of any tier.

7. The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
8. The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work which cause death, lost time injury, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately.
9. The Contractor shall promptly notify in writing to the Owner of any claims for injury or damage to personal property related to the work, either by or against the Contractor.
10. The Owner assumes no responsibility or liability for the physical condition or safety of the Work site or any improvements located on the Work site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time concerning any failure by the Contractor or any Subcontractor to comply with the requirements of this Paragraph.
11. In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.
12. The Contractor shall maintain at his own cost and expense, adequate, safe and sufficient walkways, platforms, scaffolds, ladders, hoists and all necessary, proper, and adequate equipment, apparatus, and appliances useful in carrying on the Work and which are necessary to make the place of Work safe and free from avoidable danger for clients, staff, the public and construction personnel, and as may be required by safety provisions of applicable laws, ordinances, rules regulations and building and construction codes.

END OF SECTION 013513.10

SECTION 015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls including temporary utilities, support facilities, security, and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution
 - 2. Temporary electric power and light
 - 3. Temporary heat
 - 4. Ventilation
 - 5. Telephone service
 - 6. Sanitary facilities, including drinking water
 - 7. Storm and sanitary sewer
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage sheds
 - 2. Temporary roads and paving
 - 3. Dewatering facilities and drains
 - 4. Temporary enclosures
 - 5. Hoists and temporary elevator use
 - 6. Temporary project identification signs and bulletin boards
 - 7. Waste disposal services
 - 8. Rodent and pest control
 - 9. Construction aids and miscellaneous services and facilities
- D. Security and protection facilities include, but are not limited to, to following:
 - 1. Temporary fire protection
 - 2. Barricades, warning signs, and lights
 - 3. Sidewalk bridge or enclosure fence for the site
 - 4. Environmental protection

1.3 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within (15) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations including, but not limited to, the following:
 - 1. Building code requirements
 - 2. Health and safety regulations
 - 3. Utility company regulations
 - 4. Police, fire department, and rescue squad rules
 - 5. Environmental protection regulations
- B. Standards: Comply with NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations”. ANSI A10 Series standards for “Safety Requirements for Construction and Demolition”, and NECA Electrical Design Library “Temporary Electrical Facilities”.
 - 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.

1.5 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, 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 onsite.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. If acceptable to the Designer, 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 6 Section “Rough Carpentry”.
 - 1. For job-built temporary office, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
 - 2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sized and thicknesses indicated.
 - 3. For fences and vision barriers, provide minimum 3/9” (9.5mm) thick exterior plywood.
 - 4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8” (16mm) thick exterior plywood.
- C. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.
- D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary office, shops, and shed.
- E. Paint: Comply with requirements of Division 9 Section “Painting”.
 - 1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.
 - 2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
 - 3. For interior walls of temporary offices, provide two (2) quarts interior latex-flat wall paint.
- F. 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.
- G. Water: Provide potable water approved by local health authorities.
- H. Open-Mesh Fencing: Provide 0.120” (3mm) thick, galvanized 2” (50mm) chainlink fabric fencing 6’ (2m) high with galvanized steel pipe posts, 1½” (38mm) ID for line posts and 2½” (64mm) ID for corner posts.

2.2 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: Provide ¾” (19mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100’ (30m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110 to 120V 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 rating.
- 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 fixture 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 Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated re-circulation, 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.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
 - 1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
 4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Change Order.
- B. Temporary Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
1. Sterilization: Sterilize temporary water piping prior to use.
- C. Temporary Water Service: The Owner will provide water for construction purposes from the existing building system. All required temporary extensions shall be provided and removed by the Contractor. Connection points and methods of connection shall be designated and approved by the Construction Representative.
- D. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
1. Install electric power service underground, except where overhead service must be used.
 2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125V, AC 20ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- E. Temporary Electric Power Service: The Owner will provide electric power for construction lighting and power tools. Contractors using such services shall pay all costs of temporary services, circuits, outlet, extensions, etc.
- F. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- G. Temporary Heating: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
1. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP gas or fuel-oil heaters with individual space thermostatic control.
 2. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

- H. Temporary Heating and Cooling: The normal heating and/or cooling system of the building shall be maintained in operation during the construction. Should the Contractor find it necessary to interrupt the normal HVAC service to spaces, which have not been vacated for construction, such interruptions shall be pre-scheduled with the Construction Representative.
- I. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities.
1. Telephone Lines: Provide telephone lines for the following:
 - a. Where an office has more than two (2) occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone for a fax machine in the field office.
 - c. Provide a separate line for the Owner's use.
 2. At each telephone, post a list of important telephone numbers.
- J. Temporary Telephones: The Owner will provide telephones within the facility. All construction personnel will be allowed access only to those specific telephones designated by the Construction Representative.
- K. Temporary Toilets: Install self-contained toilet units. Use of pit-type privies will not be permitted. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
1. Shield toilets to ensure privacy.
 2. Provide separate facilities for male and female personnel.
 3. Provide toilet tissue materials for each facility.
- L. Temporary Toilets: Use of the Owner's existing toilet facilities will be permitted, so long as facilities are cleaned and maintained in a condition acceptable to the Owner. All construction personnel will be allowed access only to those specific facilities designed by the Construction Representative. At substantial completion, restore these facilities to the condition prevalent at the time of initial use.
- M. Temporary Toilets: The Owner will provide toilets and associated facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.
- N. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a health and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
1. Provide paper towels or similar disposable materials for each facility.
 2. Provide covered waste containers for used material.
 3. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

- O. Wash Facilities: The Owner will provide wash facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.
- P. Drinking-Water Facilities: Provide drinking-water fountains where indicated, including paper cup supply.
- Q. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45°F to 55°F (7°C to 13°C).
- R. Drinking-Water Facilities: The Owner will provide drinking water facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.
- S. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.
 - 1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip office as follows:
 - 1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table, plan rack, and a 6-shelf bookcase.
 - 2. Equip with a water cooler and private toilet complete with water closet, lavatory, and medicine cabinet unit with a mirror.
- C. Storage facilities: Install storage 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 onsite.
- D. Storage Facilities: Limited areas for storage of building materials are available onsite. Available storage areas are shown on the drawings. The Contractor shall provide his own security. Specific locations for storage and craning operations will be discussed at the Pre-Bid Meeting and the Pre-Construction Meeting.
- E. Storage Facilities: The Owner will provide storage onsite as designated by the Facility Representative or the Construction Representative. Areas for use by the Contractor for storage will be identified at the Pre-Bid Meeting.

- F. Storage Facilities: No areas for storage of building materials can be made available onsite except for on the roof. Loads shall not exceed the loading limits as stated on the drawings. Roofing materials must be craned onto the roof from dedicated parking spaces as arranged by the Contractor with the City; costs of all such arrangements shall be paid by the Contractor. The Contractor shall provide his own security as he finds necessary. Specific locations for storage and craning operations will be discussed at the Pre-Bid Meeting and the Pre-Construction Meeting.
- G. Storage Facilities: No areas for storage of building materials can be made available onsite. The Contractor shall provide for all storage offsite. All off-site storage locations shall be approved by the Construction Representative. The Contractor shall provide his own security as he finds necessary. The Construction Representative shall have access to the off-site storage at all times.
- H. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Designer.
1. Paving: Comply with Division 2 Section "Hot-Mixed Asphalt Paving" for construction and maintenance of temporary paving.
 2. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
 3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.
 4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.
- I. Construction Parking: Parking at the site will be provided in the areas designated at the Pre-Construction Meeting.
- J. Construction Parking: Contractors must be prepared to discuss their storage and parking needs at the Pre-Bid Meeting. Parking for construction personnel cannot be provided onsite. All parking will be offsite. The Contractor will have to park on the street, in city-owned lots, or in commercial lots. Under no circumstances will any vehicle be parked in a fire lane. Parking on lawns shall be prohibited.
- K. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.

- L. 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 materials drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Install tarpaulins securely with incombustible wood framing and other materials. Close openings of 25SqFt (2.3SqM) 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 wood or plywood enclosure exceeds 100SqFt (9.2SqM) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.
- M. Temporary Lifts and Hoists: 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.
- N. Temporary Elevator Use: Refer to Division 14 for Elevators.
- O. Temporary Elevator Use: The Owner will allow use of elevators within the building. All construction personnel will be allowed access only to those specific elevators designated by the Construction Representative.
- P. Project Identification and Temporary 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 Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
 - 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- Q. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- R. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. 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°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- S. Rodent 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 are regular intervals so the Project will be free of

pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

- T. 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

- 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 Designer.
- 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 reasonable 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. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one (1) 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.
- 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. 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.
- E. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, 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 open-mesh, chainlink fencing with posts set in a compacted mixture of gravel and earth.
 - 2. Provide plywood fence, 8’ (2.5m) high, framed with (4) 2”x4” (50mm x 100mm) rails, and preservative-treated wood posts spaced not more than 8’ (2.5m) apart.

- F. Covered Walkway: Erect a structurally adequate, protective covered walkway for passage of persons along the adjacent public street. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Construct covered walkways using scaffold or shoring framing. Provide wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage. Extend the back wall beyond the structure to complete the enclosure fence. Paint and maintain in a manner acceptable to the Owner and the Designer.
- 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.
 - 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. 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. Avoid use of tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near the site.

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 Designer 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 housing.
 - 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 015000

SECTION 017400 – CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for cleaning during the Project.
- B. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
 - 1. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator for the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General
 - 1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
 - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 - 3. At least weekly, and more often if necessary, completely remove all scrap, debris, and waste material from the jobsite.
 - 4. Provide adequate storage for all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the ecology.
- B. Site
 - 1. Daily, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

2. Weekly, inspect all arrangements of materials stored onsite. Re-stack, tidy, or otherwise service all material arrangements.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures

1. Daily, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Weekly, sweep all interior spaces clean. "Clean" for the purposes of this paragraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and handheld broom.
3. In preparation for installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily while work is being performed in the space in which finish materials have been installed. "Clean" for the purposes of this subparagraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Construction Representative, may be injurious to the finish of the finish floor material.

3.2 FINAL CLEANING

- A. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.
 1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities including landscape development areas, of rubbish, waste material, litter, and foreign substances.
 2. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 3. Remove petrochemical spills, stains, and other foreign deposits.
 4. Remove tools, construction equipment, machinery, and surplus material from the site.
 5. Remove snow and ice to provide safe access to the building.
 6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 8. Broom clean concrete floors in unoccupied spaces.

9. Vacuum clean carpet and similar soft surfaces removing debris and excess nap. Shampoo, if required.
 10. Clean transparent material, 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. Polish mirrors and glass, taking care not to scratch surfaces.
 11. Remove labels that are not permanent labels.
 12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 13. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 14. Clean plumbing fixtures to a sanitary condition free of stains, including stains resulting from water exposure.
 15. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 16. Clean ducts, blowers, and coils if units were operated without filters during construction
 17. Clean food-service equipment to a sanitary condition, ready and acceptable for its intended use.
 18. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs and defective and noisy starters in fluorescent and mercury vapor fixtures.
 19. Leave the Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests. Comply with regulations of local authorities.
- D. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully.
1. Where extra materials of value remain after Final Acceptance by the Owner, they become the Owner's property.

END OF SECTION 017400

SECTION 017900 - DEMONSTRATION AND TRAINING

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 administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.
 - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.

3. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Coordination". Review methods and procedures related to demonstration and training including, but not limited to, the following:
 1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

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- a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
2. Documentation: Review the following items in detail:
- a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
- a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 007213 "General Conditions".
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 3. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner with at least seven days' advance notice.

- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
 - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
 - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
 - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
 - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 - 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

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1. Furnish additional portable lighting as required.

- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Salvage of existing items to be reused or recycled.

1.2 DEFINITION

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's on-site operations are uninterrupted.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Use of elevator and stairs.
 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.5 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective 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.
1. Before selective demolition, Owner will remove the following items:
 - a. Existing Equipment (i.e. Computers, Copiers, etc...).
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is expected that hazardous materials will be encountered in the Work.
1. Hazardous materials will be removed by Contractor before start of the Work.

- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- C. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or video and templates.

1. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: 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 Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. 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. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. 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.
 5. Maintain fire watch during and for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires. Before cutting and welding is permitted, the area shall be inspected by the individual responsible for authorizing cutting and welding operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

10. Dispose of demolished items and materials promptly.
 - B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - C. Removed and Salvaged Items:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
 - D. Removed and Reinstalled Items:
 1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
 - E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS
- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
 - B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
 - C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
 - D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings.
 - E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

ENVIRONMENTAL PROJECT MANUAL

**JEFFERSON STATE OFFICE BUILDING
205 Jefferson Street
Jefferson City, Missouri 65101**

Prepared for:

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August 2023

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SECTION 0105 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY OF WORK

A. Work to be Performed

The work consists of furnishing all labor, equipment, supplies and materials, employee training and testing, permits, agreements, registration and performance of all work in accordance with these specifications, drawings and applicable codes and regulations for the removal, transportation and disposal of selected asbestos containing materials (ACM) in conjunction with the Jefferson State Building located at 205 Jefferson Street, Jefferson City, MO 65101. Whenever there is a conflict or overlap between these specifications, regulations or codes, the most stringent provisions are applicable.

B. General Scope

The successful Contractor's scope of work includes, but is not limited to, the following

1. Bid and qualifications submittal;
2. Project plan and schedule preparation submittal and approval;
3. Pre-project documentation:
 - * Personnel medicals
 - * Asbestos, lead training verification
 - * Respirator program verification
 - * Equipment/supply specification submittals/approval
3. Insurance submittal and approval;
4. Facility baseline survey;
5. Regulatory notifications;
6. Removal area isolation;
7. Electrical and HVAC System isolation;
8. Decontamination system set-up;
9. Removal and disposal of selected ACMs as needed;
10. Project documentation;
11. Demobilization;
12. Project Closeout Documentation.

C. Site Description

The Jefferson State Office Building is a 14-story office building with basement and penthouse areas. The building has interior walls constructed of drywall, cinder block and concrete. The flooring materials consist of broadloom wall-to-wall carpet, carpet squares, 12" vinyl composite tile (VCT) floor tile, ceramic tile, terrazzo, mastic on concrete, painted concrete or bare concrete floors. The building has a forced air HVAC system with air handler rooms located on each floor. Some floors are known to have been abated of asbestos floor tile, but floor tile may still remain under existing wall partitions and mastics may have been left in-place.

D. General Requirements

It is the Owner's goal to remove selected ACMs from within building, therefore, the Contractor's base bid must be a comprehensive price that includes any and all eventualities to perform this scope of work. The quantities identified in the scope of work are estimates only. Therefore, it is mandatory that the bidder physically verify all asbestos quantities to ensure that their base bid is comprehensive and accurate.

An Alternate No. 6 pricing is requested for abatement of asbestos containing mastics located within the Elevator Lobby's on floors 2 thru 14.

Note: Asbestos containing mastics exist under some wall partitions throughout the building – scheduled demolition may take place prior to abatement activities. Wall partitions that have not been demolished prior to commencement of abatement activities will have the asbestos mastics to remain in-place.

E. Environmental Work Requirements

In addition to General Requirements, the following specific work procedures and site activities shall be followed for the Jefferson State Building.

1. The contractor shall prepare all necessary documentation required under applicable federal, state, and local law, regulations, and requirements for management of environmentally impacted media.
2. The Owner shall provide the cost of the first set of clearance sampling relating to the asbestos clearance air testing. If the Contractor fails to meet the clearance criteria the first time, the Contractor shall be assessed all charges for the owner's representative's time and analytical expenses to conduct further asbestos clearance testing.
3. The Contractor shall have access to the work site during normal operating hours, 7:00 a.m. - 5:00 p.m., Monday through Friday.

4. The Owner shall be responsible to provide all water and electricity to perform asbestos abatement and related work in accordance with the requirements of this specification and the contract documents.
5. The Contractor shall perform OSHA compliance personnel air monitoring during all asbestos abatement work.
6. The Contractor shall be responsible for the security of the site and the owner will not be responsible for lost or stolen items.

F. Site Inspection

Professional Environmental Engineers, Inc. (PE) was contracted by McClure Engineering to perform an asbestos containing materials (ACM) survey of flooring materials at the Jefferson State Office Building located at 205 Jefferson Street, Jefferson City, Missouri. The survey included all fourteen floors of the building and the basement.

Mr. Matt Honerkamp conducted the ACM survey with the assistance of the building’s maintenance staff. The survey was non-destructive in nature. The survey was performed from August 9 through August 11, 2021, while the building was occupied.

G. Base Bid Scope of Work

The quantities for the base bid are estimated to reflect both visual determinations of ACMs as well as estimated quantities behind wall partitions and pipe chases. The summary of identified ACMs to be included within the base bid, quantities and work practices to be utilized are presented within **Table 1**.

Table 1
Base Bid - Scope of Work
Jefferson State Office Building

Location	Description	Estimated Quantity	Work Practice
First Floor			
First Floor - East Kitchenette & Hallway	12" Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	552 SF	SECTION 0158
First Floor – NE Corner	Flooring Beneath Carpet Squares (Mastic = 9% Chrysotile)	10,580 SF	SECTION 0158
First Floor - Mail Room	Mastic Beneath Carpet (Mastic = 8 % Chrysotile)	1,790 SF	SECTION 0158

Location	Description	Estimated Quantity	Work Practice
First Floor - DSS Office	Mastic Beneath Carpet Squares (Mastic = 6% Chrysotile)	325 SF	SECTION 0158
First Floor - Kitchen Area/Office	12" White Pattern Mastic (Mastic = 6% Chrysotile)	1,086 SF (includes Kitchen)	SECTION 0158
First Floor - DESE Conference Room	Mastic Beneath Carpet Squares (Mastic = 9% Chrysotile)	760 SF	SECTION 0158
Second Floor			
Second Floor	Mastic Beneath Carpet (Mastic = 9% Chrysotile)	12,600 SF	SECTION 0158
Second Floor – Coffee Shop	12" Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Third Floor			
Third Floor - Mechanical Room	12" Beige Pattern Floor Tile/Mastic (Mastic = 6% Chrysotile)	529 SF	SECTION 0158
Third Floor	Floor Mastic (Mastic = 7 % Chrysotile)	12,300 SF	SECTION 0158
Third Floor – Coffee Shop	12" Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Fourth Floor			
Fourth Floor	Floor Mastic (Mastic = 8 % Chrysotile)	12,300 SF	SECTION 0158
Fourth Floor – Coffee Shop	12" Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Fifth Floor			
Fifth Floor - Mechanical Room	12" Beige Pattern Floor Tile/Mastic (Mastic = 9% Chrysotile)	378 SF	SECTION 0158

Location	Description	Estimated Quantity	Work Practice
Fifth Floor – Coffee Shop	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Sixth Floor			
Sixth Floor – Kitchenette	12” Brown Floor Tile/Mastic (Mastic = 7% Chrysotile)	72 SF	SECTION 0158
Sixth Floor	Floor Mastic (Mastic = 8 % Chrysotile)	12,300 SF	SECTION 0158
Seventh Floor			
Seventh Floor	Floor Mastic Beneath Carpet (Mastic = 9 % Chrysotile)	12,300 SF	SECTION 0158
Seventh Floor – Coffee Shop	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Eighth Floor			
Eighth Floor	Mastic Beneath Carpet (Mastic = 6 % Chrysotile)	6,725 SF	SECTION 0158
Eighth Floor – Coffee Shop	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Ninth Floor			
Ninth Floor - Mechanical Room	12” Beige Pattern Floor Tile/Mastic (Mastic = 7% Chrysotile)	378 SF	SECTION 0158
Ninth Floor – Kitchenette	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Tenth Floor			
Tenth Floor	Mastic Beneath Carpet Squares (Mastic = 8% Chrysotile)	12,300 SF	SECTION 0158

Location	Description	Estimated Quantity	Work Practice
Tenth Floor – Kitchenette	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Eleventh Floor			
Floor	Mastic Beneath Carpet Squares (Mastic = 9% Chrysotile)	8,000 SF	SECTION 0158
Eleventh Floor - Mechanical Room	12” Beige Pattern Floor Tile/Mastic (Mastic = 6% Chrysotile)	378 SF	SECTION 0158
Eleventh Floor - Caucus Room Entrance	Mastic Beneath Old Partition Wall (Mastic = 7% Chrysotile)	Throughout Building	SECTION 0158
Eleventh Floor – Kitchenette	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Twelfth Floor			
Twelfth Floor	Mastic Beneath Carpet Squares (Mastic = 9% Chrysotile)	12,300 SF	SECTION 0158
Eleventh Floor – Coffee Shop	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	72 SF	SECTION 0158
Thirteenth Floor			
Thirteenth Floor - Mechanical Room	12” Beige Pattern Floor Tile/Mastic (Mastic = 6% Chrysotile)	378 SF	SECTION 0158
Thirteenth Floor – SE Office	Old Carpet/Mastic Beneath Partition Wall (Mastic = 7% Chrysotile)	Throughout Building	SECTION 0158
Thirteenth Floor	Mastic Beneath Carpet Squares (Mastic = 9% Chrysotile)	12,300 SF	SECTION 0158

Location	Description	Estimated Quantity	Work Practice
Thirteenth Floor – Kitchenette	12” White Pattern Floor Tile/Mastic (Mastic = 7% Chrysotile)	72 SF	SECTION 0158
Fourteenth Floor			
Eleventh Floor – Coffee Shop	12” Brown Floor Tile/Mastic (Mastic = 8% Chrysotile)	200 SF	SECTION 0158

Table 2
Alternate No. 6 - Scope of Work
Jefferson State Office Building

Location	Description	Estimated Quantity	Work Practice
Second Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Third Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Fourth Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Fifth Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Sixth Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Seventh Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Eighth Floor - Elevator Lobby	12” Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158

Ninth Floor - Elevator Lobby	12" Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Tenth Floor - Elevator Lobby	12" Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Eleventh Floor - Elevator Lobby	12" Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Twelfth Floor - Elevator Lobby	12" Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Thirteenth Floor - Elevator Lobby	12" Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158
Fourteenth Floor – Elevator Lobby	12" Brown Floor Tile/Mastic (Mastic = 6% Chrysotile)	300 SF	SECTION 0158

1.2. CONDUCT OF WORK

A. Premises

The Contractor’s work will be confined to the property addresses where work is being conducted. The Contractor will be responsible to take all precautions necessary to limit access to work areas and to protect building’s occupants, and any adjacent properties during the removal period.

B. Use of the Site

The Contractor shall confine operations at the site to the areas permitted under the Contract and indicated in the scope of work and specification. The Contractor will conform to site rules and regulations affecting the work while engaged in project construction including the following:

1. Do not unreasonably encumber the site with materials or equipment. The building will be restricted to those individuals performing asbestos abatement activities. Keep the site free from accumulation of waste, rubbish or construction debris.
2. Open fires will not be permitted within the building enclosure or on the premises.

3. Protect all property within the work site. All and any damage is to be repaired at the Contractor's expense.
4. Seal all openings through the walls where they are penetrated by ducts, pipes, conduits, or any other openings where the work being performed could cause adjacent areas or other areas of the building to be contaminated. The Contractor shall be liable for all costs incurred to correct and remove any contamination of other areas due to negligence for any reason. The Owner shall assume no additional costs or obligations for requirements contained in this paragraph. Work practices utilized to contain asbestos during the abatement shall conform, where applicable, to the precautions and procedures are described within these Specifications. All other work practices and procedures included in this specification shall apply unless waived in writing by the Owner or Owner representative.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0110 – PROJECT COORDINATION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Coordination

Coordination with the Owner shall be made through the owner's representative to assure compliance from the Contractor in completing the work with a minimum of interference and inconvenience. The Contractor shall submit regulatory notification information to the Owner's representative for review. The Contractor shall submit schedules and plans to the Owner's representative to do the work and shall notify the representative at least two days in advance of changes and/or revisions in the schedule. The Contractor shall provide all labor and materials required to keep pace with the specified schedule requirements.

B. Access

The Contractor shall have access to the work site during normal operating hours, 7:00 a.m. - 5:00 p.m., Monday through Friday. Work hours other than as specified above shall be coordinated with building owner, general contractor and Owner's representative.

C. Summary

This section specifies administrative and supervisory requirements needed for project coordination:

1. Progress Meetings
2. Pre-Construction Meeting
3. Contractor Daily Log

1.2 PROGRESS MEETINGS

- A. The Contractor shall attend regularly scheduled meetings with the owner's representative. These meetings shall include: review of overall project status and work schedules; memorandum on required coordination, activities, notices and reports; reporting unusual events and accidents; submissions of technical data on materials, products, personnel, governing regulations, and safety equipment required by the Contract Documents; inspection and testing requirements; purchases and deliveries; space and access limitations; manufacturer's recommendations; compatibility of materials; acceptability of substitutes; possible conflicts and compatibility problems; and performance requirements. The Contractor shall also keep the owner's authorized

representative advised of all abatement activities during the project. The Owner or his authorized representative shall have the right to restrict the Contractor's work to comply with their proper operation and function of the overall project.

1.3 PRE-CONSTRUCTION MEETING

A. Attendance

The Contractor and supervisory personnel, who provide on-site direction of the abatement activities, must attend a pre-start or pre-construction meeting. The owner's representative will be present at this meeting.

B. Information provided by the Contractor

Three (3) working days prior to this meeting, the Contractor shall provide all submittals as required by this specification for the asbestos abatement. In addition, the Contractor shall be prepared to provide detailed information concerning:

1. Preparation of the Work Area
2. Personal protection equipment including respiratory protection and protective clothing
3. Employees, including the Project Manager, who will participate in the project, including delineation of experience, training and assigned responsibilities during the project
4. Decontamination procedures for the abatement personnel, Work Area and equipment
5. Abatement methods and procedures to be used
6. Required OSHA air monitoring procedures and sampling protocols
7. Procedures for handling and transporting waste materials
8. Procedures for final decontamination and cleanup
9. A sequence of work and performance schedule

1.4 CONTRACTOR DAILY LOG

The Contractor shall maintain a daily log documenting the following items:

1. Meetings; purpose, attendees, brief discussion
2. Site visitations
3. Sign-in sheet (workers, visitors)
4. OSHA air monitoring tests and results
5. Regulatory inspections
6. Daily work schedule & activity summary
7. Containment sign-in sheets

A copy of the Contractor sign-in sheet, daily log of activities and OSHA air monitoring results will be given weekly to the owner's representative.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0120 – DEFINITIONS AND STANDARDS

PART 1 – GENERAL

1.1 DEFINITIONS

- A. **General Explanation:** A substantial amount of specification language constitutes definitions for terms found in other contract documents, including the drawings. (Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated thereon). Certain terms used in contract documents are defined in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to the extent they are not stated more explicitly in another element of contract documents. Other definitions are included in sections where applicable.
- B. **General Requirements:** The provisions or requirements of Divisions 1 and 2 apply to entire work of Asbestos Abatement and, where so indicated, to other elements which are included in the project.
- C. **Indicated:** The term "Indicated" is a cross-reference to graphic representations, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping readers locate a cross-reference, and no limitation of location is intended except as specifically noted.
- D. **Directed, Requested, etc.:** Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Owner's representative" and similar phrases. However, no such implied meaning will be interpreted to extend the Owner's representative's responsibility into Contractor's responsibility for construction supervision.
- E. **Approve:** Where used in conjunction with the Owner's representative's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of the term "approved" will be held to limitations of Owner's representative's responsibilities and duties as specified in General, Special and Supplementary Conditions. In no case will "approval" by Contracting Officer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.
- F. **Project Site:** The term "project site" is defined as the space available to Contractor for performance of the work, either exclusively or in conjunction with others performing other work as part of the project.

- G. Furnish:** Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- H. Install:** Except as otherwise defined in greater detail, term "install" is used to describe operations at the project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations, as applicable in each instance.
- I. Provide:** Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
- J. Installer:** The term "installer" is defined as the entity (person or firm) engaged by the Contractor, or its subcontractor or sub-subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in operations they are engaged to perform.
- K. Testing Laboratory:** The term "testing laboratory" is defined as an independent entity of the Contractor engaged to perform specific inspections or tests of the work, either at the project site or elsewhere; and to report and (if required) interpret results of those inspections or tests. The testing laboratory shall be a current, proficient, participant in National Institute for Occupational Safety and Health Proficiency Analytical Testing (NIOSH PAT) program, or be accredited by the required organizations (American Industrial Hygiene Association (AIHA) and the National Voluntary Laboratory Accreditation Program (NVLAP)).
- L. Owner's representative:** The owner's representative is the entity representing the owner for this project with the authority to stop the work upon verbal order if requirements of the contract documents are not met, or if the interests of the owner, safety of any person or the owner's property are jeopardized by the work. All references to Architect or Engineer in the contract documents shall in all cases refer to the owner's representative. The owner's representative will represent the owner during construction and until final payment is due. The owner's representative will advise and consult with the owner. The Owner's instructions to the Contractor shall be forwarded through the Owner's representative.
- M. Project Manager:** The Project Manager is the Contractor's representative at the work site. This person will generally be the competent person required by OSHA in 29 CFR 1926.

1.2 DEFINITIONS RELATIVE TO ASBESTOS ABATEMENT

- A. **Aerosol:** A system consisting of particles, solid or liquid, suspended in air.
- B. **Air Cell:** Insulation normally used on pipes and duct work that is comprised of corrugated cardboard which is frequently comprised of asbestos combined with cellulose or refractory binders.
- C. **Air Filtration Device (AFD):** A local exhaust system, utilizing HEPA filtration capable of maintaining a negative pressure inside the work area and a constant air flow from adjacent areas into the work area and exhausting that air through HEPA filters outside the work area.
- D. **Air Monitoring:** Measuring the fiber content of a specific volume of air.
- E. **Amended Water:** Water to which a surfactant has been added to increase the surface tension too less than or equal to 35 dynes.
- F. **Asbestos:** The asbestiform varieties of serpentine (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite. For purposes of determining respiratory and worker protection, both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered as asbestos. Chrysotile and amosite asbestos is present in the boiler insulation; chrysotile asbestos is in the pipe joint insulations, floor tile, mastics, etc.
- G. **Asbestos-Containing Material (ACM):** Any material containing more than 1% by weight of asbestos of any type or mixture of types.
- H. **Asbestos-Contaminated Material:** Any material, which is or is suspected of being or any material contaminated with an asbestos-containing material which is to be removed from a work area for disposal.
- I. **Authorized Visitor:** The Owner's representative, testing lab personnel, the Architect/Engineer or a representative of any federal, state and local regulatory or other agency having authority over the project.
- J. **Breathing Zone:** A hemisphere forward of the shoulders with a radius of approximately 9 to 12 inches.
- K. **Ceiling Concentration:** The concentration of an airborne substance that shall not be exceeded.

- L. **Certified Industrial Hygienist (CIH):** An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.
- M. **Clean Zone:** Areas outside of project scope that contains background levels of airborne particulate.
- N. **Clearance Monitoring/Air Sampling:** Air Sampling conducted to verify that the clearance criteria have been achieved in compliance with applicable regulation and/or this specification.
- O. **Compliance Air Sampling:** Air sampling conducted during the progress of work to verify airborne asbestos limits are not exceeded and that adequate respiratory protection measures are being used. Analysis by Phase Contrast Microscopy (PCM).
- P. **Disposal Facility:** An off-site facility that receives for processing, to include recycling, reuse, recovery, incineration, treatment, land application, fuels recovery, dechlorination, stabilization, landfill, and/or disposal.
- Q. **Full-Containment Work Area:** A Work Area which has been sealed, plasticized, and equipped with a Personnel Decontamination System, an Equipment Decontamination System and a Negative Pressure System.
- R. **Critical Barrier:** Isolation barrier that isolates the work area from clean areas.
- S. **Curtained Doorway:** A device to allow ingress or egress from one room to another while permitting one-way air movement between the rooms, typically constructed by placing three layered sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top. All sheets hang straight and maintain a seal over the doorway when not in use. Other effective designs are permissible.
- T. **Curtained Doorway - One Way Type:** A device to allow ingress or egress from one room to another while permitting one-way air movement between the rooms, typically constructed by placing a sheet of plastic over an existing or temporarily framed doorway, securing at along the top, side and bottom of the doorway. A slit is provided in the plastic sheet and the edges are reinforced with duct tape. A second layer of plastic is placed on the dirty side of each doorway and secured at the top with weights applied to the bottom. Make-up air will flow through the doorway to the work area.
- U. **Decontamination Zones:** Contained areas consisting of the vacuum zone and the shower/wet-cleaning zone arranged per Section 0185.
- V. **Demolition:** The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.

- W. **Disposal Bag:** 6-mil thick leak-tight plastic bags used for transporting asbestos waste from work site to the disposal site. Each is labeled per regulations as follows:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

and

RQ
HAZARDOUS SUBSTANCE
SOLID ASBESTOS
N.O.S.

- X. **Dust Controlled Work Area:** A limited access work area typically used in large-scale glovebagging. This area is sealed, but not necessarily fully plasticized. This area is not equipped with a personnel decontamination system.
- Y. **Encapsulant:** A material that surrounds or embeds asbestos fibers in an adhesive matrix, to prevent release of fibers.

Bridging encapsulant: an encapsulant that forms a flexible membrane on the surface of an in situ asbestos matrix.

Penetrating encapsulant: an encapsulant that saturates the in situ asbestos matrix to the substrate.

Removal encapsulant: a penetrating encapsulant specifically designed for removal of asbestos-containing materials.

- Z. **Encapsulation:** Treatment of asbestos-containing materials, with an encapsulant to form an elastomeric, impact resistant membrane between the material and ambient air.
- AA. **Enclosure:** The construction of an airtight, impermeable, permanent barrier around asbestos-containing material to control the release of asbestos fibers into the air.
- BB. **Filter:** A media component used to remove solid or liquid particles from varied media.
- CC. **Friable Asbestos Material:** Material that contains more than 1.0% asbestos by weight and that can be crumbled, pulverized, or reduced to powder by hand pressure.

- DD. Glovebag Technique:** A method for removing friable Asbestos Containing Material from HVAC ducts, short piping runs, valves, joints, elbows and other non-planar surfaces within a self-contained bag enclosure. The glovebag assembly is a manufactured or fabricated device consisting of a glovebag (typically constructed of 6-mil transparent polyethylene or polyvinylchloride 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 all asbestos fibers released during the process. All workers who are permitted to use the Glovebag Technique must be highly trained, experienced and skilled in this method.
- EE. HEPA Filter:** A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining 99.97% of fibers greater than 0.3 microns in length.
- FF. HEPA Filter Vacuum Collection Equipment (or vacuum cleaner):** High efficiency particulate air (absolute) filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters should be of 99.97% efficiency for retaining fibers of 0.3 microns or larger.
- GG. Limited-Containment Work Area:** An isolated or controlled access Work Area is typically used with large-scale glovebagging and in the preparation of containment in contaminated areas. This area is sealed, but not necessarily fully plasticized. The area is not necessarily equipped with a Personnel Decontamination System connected directly to the Work Area but it is recommended. An Equipment Decontamination System is recommended but not mandatory. This area utilizes a negative pressure ventilation system.
- HH. Negative Pressure Respirator:** A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
- II. Negative Pressure Ventilation System:** A local exhaust system, utilizing HEPA filtration capable of maintaining a negative pressure inside the work area and a constant air flow from adjacent areas into the work area and exhausting that air through HEPA filters outside the work area.
- JJ. Negative Pressure:** Air pressure lower than surrounding areas, generally caused by exhausting air from a sealed space (work area).
- KK. Personal Monitoring:** Sampling of the asbestos fiber concentrations within the breathing zone of an employee.
- LL. Plasticize:** To cover floors, ceilings, and walls with plastic sheeting as herein specified.

- MM. Protection Factor:** The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- NN. Respirator:** A device designed to protect the wearer from the inhalation of harmful atmospheres. Shall be in accordance with OSHA Regulation 1910.1001(d), k OSHA regulation 1910.134 and ANSI Z88.2-1992. Respirators shall also be approved by NIOSH under the provisions of 30 CFR Part II.
- OO. Time Weighted Average (TWA):** The average concentration of a contaminant in air during a specific time period.
- PP. Trace Fiber Fixation:** Encapsulation procedure conducted on all surfaces from which asbestos has been removed to permanently seal any remaining ACM.
- QQ. Visible Emissions:** Any emissions containing particulate material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
- RR. Wet Cleaning:** The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos contaminated waste.
- SS. Work Area:** The area where asbestos related work or removal operations are performed which is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel. Work area is a Regulated Area as defined by 29 CFR 1926 as designated on drawings.
- TT. Visible Debris:** Any particulate asbestos material or residue that is visually detectable on a surface without the aid of instruments.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0125 – CODES AND REGULATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

This section sets forth governmental regulations and industry standards, which are included and incorporated herein by reference and made a part of the specification. The Contractor is responsible for acquiring applicable permits for completion of work and shall send copies of all permits to the Owner's representative. The Contractor shall also meet all requirements of federal, state and local regulations.

A. General Applicability of Codes, Regulations, and Standards

Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

B. Contractor Responsibility

The Contractor shall assume full responsibility and liability for the compliance with all applicable federal, state and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, state, and local regulations. The Contractor shall hold the Owner and owner's representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

C. Federal Requirements

Federal requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include, but are not limited to, the following:

1. **U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), including but not limited to:**

Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules Title 29, Part 1910, Section 1001 and Part 1926, Section 1101 of the Code of Federal Regulations

Respiratory Protection

Title 29, Part 1910, Section 134 of the Code of Federal Regulations

Occupational Safety and Health Administration (OSHA) 29 CFR 1926.62 –
Lead Standard

Construction Industry

Title 29, Part 1926, of the Code of Federal Regulations

Hazard Communication

Title 29, Part 1910, Section 1200 of the Code of Federal Regulations

Specifications for Accident Prevention Signs and Tags

Title 29, Part 1910, Section 145 of the Code of Federal Regulations

2. U.S. Environmental Protection Agency

Asbestos Abatement Project Rule

40 CFR Part 762, Subpart G of the Code of Federal Regulations

Regulation for Asbestos

Title 40, Part 61, Subpart A of the Code of Federal Regulations

National Emission Standard for Asbestos (NESHAPS)

Title 40, Part 61, Subpart M (Revised Subpart B)
of the Code of Federal Regulations

Resource Conservation and Recovery Act

Title 40, Part 261 of the Code of Federal Regulations

3. U.S. Department of Transportation (DOT), including but not limited to:

Hazardous Substance Title 29, Part 171 and 172 of the Code of Federal
Regulations

**4. State Requirements, which govern asbestos abatement and hazardous
waste transportation and disposal work including but are not limited:**

Missouri Department of Natural Resources (MDNR)

Missouri Department of Health 19 CSR 30-70.600-630 Lead Regulations.

**5. Local Requirements - Abide by all local requirements that govern asbestos,
lead abatement and underground storage tank removal work or hauling and
disposal.**

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0130 – SUBMITTALS AND NOTIFICATIONS

PART 1 – GENERAL

1.1 QUALIFICATIONS

The Owner requires qualified contractors and subcontractors to perform all work under this contract. The Owner reserves the right to make final approval of the Contractor's qualifications for performing this work. To be considered "qualified" for performance of asbestos, lead abatement projects, the Contractor and his subcontractors must fulfill the following:

A. Registration

The Contractor and subcontractors must be registered per Section 0125 of this specification.

B. Worker Training

In accordance with 29 CFR 1926 and the Missouri Department of Natural Resources (MDNR), all workers must be trained in an approved class in the dangers inherent in handling asbestos, lead, proper work procedures, and personal and area protective measures. MDNR certificates for each worker, supervisor, or management person involved in the abatement project must be submitted to the owner's representative. The topics covered in the course must include the following (at a minimum):

- Methods of recognizing asbestos
- Health effects associated with asbestos
- Relationship between smoking and asbestos in producing lung cancer
- Nature of operations that could result in exposure to asbestos
- Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
 - Engineering Controls
 - Work Practices
 - Respirators
 - Housekeeping Procedures
 - Hygiene Facilities
 - Protective Clothing
 - Decontamination Procedures
 - Emergency Procedures

- Waste Disposal Procedures
- Purpose, proper use, fitting, instructions, and limitations of respirators as required by 29 CFR 1910.134
- Appropriate work practices for the work to be conducted
- Requirements of medical surveillance program
- Review of 29 CFR 1926
- Negative air systems
- Work practices including hands-on or on-job training
- Personal decontamination procedures
- Air monitoring, personal and area

C. Superintendent Qualifications

The asbestos abatement site superintendent shall be in primary charge of the project and shall be available at all times during the abatement project. The superintendent shall also be on site at all times unless a competent supervisor is present on site, as determined by the owner's environmental representative. The superintendent shall have a minimum of five years of experience in asbestos abatement, with at least three years experience as site superintendent. Asbestos abatement site superintendents shall be licensed, accredited, and/or trained in accordance with applicable federal, state, local, and other requirements.

D. Medical Examinations

The Contractor must provide medical examinations for all on-site workers. Examination shall, as a minimum, meet OSHA requirements as set forth in 29 CFR 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

1.2 SUBMITTALS WITH BIDS

The Contractor must document and submit the following information with his bid:

A. Statement of Qualifications

1. Recent project references consisting of names and phone numbers of at least three clients. The client references should include building owners or property managers for abatement projects of similar or greater size and complexity.
2. Company history/profile.
3. Resume, qualifications, certifications, training and licenses of proposed project site superintendent(s) proposed for the project. (Do not send information for workers in the qualifications package).

4. List and explanation of all OSHA/EPA/State environmental regulatory violations of any type in the past 5 years, including contact person and telephone number of the regulatory agency. If no violations occurred, a written certification must be made to this effect and included in the qualification package.
5. Documentation from the worker compensation carrier of the company's experience modification rating for the last three years (2019, 2020 and 2021).
6. A listing of all legal judgments and settlements in which the Contractor was found guilty or liable, or they or their insurance carriers made any settlement or other payments associated with the claim.
7. Evidence that the Contractor maintains or holds all applicable licenses.
8. Evidence that the Contractor is capable of obtaining sufficient insurance and bonding for the project.

1.3 POST AWARD SUBMITTALS

The Contractor shall submit upon notification of award of this contract the following information within 10 days:

- A. **Project Schedule:** The plan of activities to be used to conform to this specification and contract.
- B. **Certificate of Worker Acknowledgment:** A signed copy of the Certificate of Worker's Acknowledgment found at the end of this section for each worker who is to be at the job site or entering the work area (see Attachment 1).
- C. **Training Program:** A list of employees and the MDNR worker/supervisor training certificates for each on-site individual.
- D. **Report from Medical Examination:** A report from a medical examination conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the work area. Submit, at a minimum, for each worker the following:
 1. Name and Social Security Number.
 2. Physicians Written Opinion from examining physician including at a minimum the following:
 - Any recommended limitations on the worker or on the use of personal protective equipment such as respirators.

- Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.
 - Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
 - Copy of information that was provided to physician in compliance with 29 CFR 1926.
 - Statement that worker is able to wear and use the type of respiratory protection proposed for the project, and is able to work safely in an environment capable of producing heat stress in the worker.
- E. Product Data:** Safety Data Sheets (SDSs) sheets shall be provided for the following materials: aerosol spray adhesives, mastic removers, amended water solutions, and encapsulants.
- G. Respiratory Protection Program:** Submit level of respiratory protection intended for each operation required by the project.
- H. Health and Safety Plan:** The Contractor shall submit his health and safety plan, including personnel protection guidelines, emergency procedures, and contingency plan.
- I. Utilities:** Utility needs, necessary connections and locations for equipment to be used.
- J. Subcontractors:** The successful Contractor must submit name and qualifications and certification for any subcontractors and analytical laboratory to be utilized.
- K. Insurance:** The Contractor involved in abatement activities will be required to demonstrate adequate insurance coverage for the activities they perform. Contractors should be prepared to demonstrate coverage or obtain coverage for all risks associated with the abatement activities, including but not limited to worker's compensation, general liability, pollution liability, specific toxic substance liability, and other insurance, as applicable to the general partner's owner's representative or Contractor role and responsibilities. Acceptable confirmation of the Contractor(s) insurance coverage (e.g., insurance certificate) should be provided to the owner prior to contract execution. The Contractor shall be prepared to provide complete copies of their insurance policies upon request. In all cases, the approved abatement Contractor shall provide insurance certificates naming the partnership and any other applicable entity as additional insured prior to beginning work on the project.

- L. **Licenses, Permits and Registrations:** Copies of all State and local licenses and registrations necessary to carry out the work of this contract.
- M. **Waste Disposal:** Copy of state or local license for waste hauler. Name, address, and identification number of disposal sites for all asbestos wastes.

1.4 NOTICES

A. Requirements

1. The Contractor will prepare and submit all information required for notification prior to project start-up. No site work or demolition shall take place until approval is given.
2. The owner's representative must first approve any waivers requested by the Contractor from the regulatory requirements.

B. Prior to Disposal of the Asbestos Waste:

1. The Contractor shall provide the name and address of the disposal sites for all special/hazardous/asbestos wastes.
2. The Contractor shall provide a copy of all waste profiles.
3. The Contractor shall indicate means of transportation to the waste site special/hazardous/asbestos waste facilities.
4. The Owner shall provide laboratory results of asbestos sample analysis if needed by Contractor.

1.5 PERMITS

The Contractor shall obtain construction permits, where applicable, specifically for asbestos abatement.

1.6 LICENSES

The Contractor shall maintain current licenses as required by the MDNR and MDOH for the removal, transporting, disposal or other regulated activity relative to the work of this contract.

1.7 POSTING AND FILING OF REGULATIONS

The Contractor shall maintain a copy of applicable Federal, State and local regulations on the project site.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0135 – TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Air Monitoring

This section describes air monitoring to be carried out by the owner’s representative to verify that the building air beyond the work area, outside environment and within the work area remain below specified limits. This section also sets forth airborne fiber levels both inside and outside the work area as action levels, and describes the action required by the Contractor if an action level is met or exceeded.

1. Should any of the action limits be exceeded, the Contractor shall immediately cease asbestos abatement activities until the fault is corrected. Work shall not recommence until authorized by the Owner’s representative. Air monitoring required by OSHA is the responsibility of the Contractor.
2. The owner’s representative will monitor airborne fiber counts in the work area decontamination zones and clean area. The purpose of this air monitoring will be to detect airborne fiber counts which may significantly challenge the integrity of the work area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
3. To determine if the elevated airborne fiber counts encountered during abatement operations have been maintained at an acceptable level and before the space is released and initial barriers are removed, the owner’s representative will sample and analyze air per Section 0195.
4. The owner’s representative may conduct additional compliance/certification air monitoring throughout the course of the project to verify the validity of Contractor’s sample results.

B. Airborne Fiber Count Ceilings: Analysis by PCM - NIOSH 7400

Stop Action Level (f/cc)	Immediate Stop Level (f/cc)	Minimum Respirator	Minimum Protection Factor
0.1	1.0	Half-face	10
0.5	5.0	PAPR	100
1.0	10.0	Type C Supplied Air	1,000

1. Inside Work Area: Maintain an average airborne count in the work area in accordance with respiratory protection used noted above. If the fiber counts rise

above this figure for any sample taken, revise work procedures to lower fiber counts. If the fiber count exceeds allowable limits, stop all work, leave negative air system in operation undertake corrective action, and notify owner's representative. Do not recommence work until authorized in writing by owner's representative.

2. If airborne fiber counts exceed Immediate Stop Level given above for type of respiratory protection in use for any period of time, cease all work except corrective action. Do not recommence work until fiber counts fall below Stop Action Level given above for the type of respiratory protection in use. After correcting cause of high fiber levels, do not recommence work for 24 hours unless otherwise authorized, in writing, by owner's representative.
3. Outside Work Area: If any air sample taken outside of the work area exceeds the baseline or 0.01 fibers/cubic centimeter (f/cc), whichever is higher, immediately stop all work. If this air sample was taken inside the building and outside of critical barriers around the work area, immediately erect new critical barriers to isolate the affected area from the balance of the building.
4. Analytical Procedure: Sampling and analysis shall be as per NIOSH 582 (7400 Method). The following procedure will be used to resolve any disputes regarding fiber types when a project has been stopped due to excessive airborne fiber counts in any area. "Airborne Fibers" referred to above include all fibers regardless of composition as counted in the NIOSH 582 (7400 Method). If work has stopped due to high airborne fiber counts and the Contractor disputes the work stoppage, air samples will be secured in the same area by the owner's representative for analysis by transmission electron microscopy. The costs for all sampling required to resolve disputes are the responsibility of the Contractor.

1.2 SCHEDULE OF AIR SAMPLES

A. Before Start of Work (Baseline) Samples

The owner's representative will secure the following air samples to establish a baseline before start of work:

Location	Number of Samples	Analytical Procedure	Detection Limit (f/cc)	Minimum Volume (Liters)	Rate (Liters/Minute)
Per Area	5	PCM	0.01	1200	2-10

Baseline is an action level expressed in fibers per cubic centimeter, which is the highest of the samples collected on cellulose ester filters, or 0.010 fibers per cubic centimeter. The number and frequency of baseline samples may be modified at the Owner's discretion.

B. Daily Samples

From start of site work through the work of Section 0190 – Project Decontamination, the owner’s representative shall take samples on a daily or as needed basis. Samples will be collected on 25-mm cassettes with the following filter media: PCM: 0.8 micrometer mixed cellulose ester.

Location Sampled	Number of Samples	Analysis Method	Sampling Sensitivity (f/cc)	Minimum Volume (Liters)	Rate (LPM)
Clean Room	1	PCM	0.010	900	2-10
Critical Barriers	1	PCM	0.010	900	2-10
Inside Work Area	1	PCM	0.010	900	2-10
Negative Air Output	1	PCM	0.010	900	2-10

The number and frequency of samples may be modified at the Owner's discretion. If airborne fiber counts exceed allowed limits, additional samples will be taken as necessary to monitor fiber levels.

C. Clearance Samples

All final clearance samples shall be collected under dry conditions using aggressive techniques. Aggressive techniques should be conducted in accordance with Appendix M of the 1985 United States Environmental Protection Agency document *“Guidance for Controlling Asbestos-Containing Materials in Buildings”* (the Purple Book). All barriers, except critical barriers, shall be removed for final clearance, unless the abatement area is not isolated from adjacent areas, or aggressive techniques are likely to contaminate adjacent areas.

A minimum of two clearance samples shall be collected for each area clearance when the activities involve gross abatement of asbestos materials. For gross abatement areas greater than 5,000 square feet or 50,000 cubic feet, an additional sample is required for each additional 2,500 square feet or 25,000 cubic feet, whichever is more stringent (e.g., an enclosure of 10,000 square feet or 100,000 cubic feet would require 7 clearance samples).

The clearance criterion for all PCM clearance air samples is less than 0.01 fibers/cubic centimeter.

1.3 TESTING/MONITORING

A. Laboratory Testing

1. The environmental contractor shall provide the owner's representative with laboratory certifications.
2. The services of a testing laboratory shall be employed by the Contractor to perform laboratory analysis of the OSHA compliance air samples. A complete record, certified by the testing laboratory, of all Contractor air monitoring tests and results will be furnished to the owner's representative.
3. Written Reports: Copies of all OSHA compliance air monitoring test results will be posted at the job site on a daily basis.

B. Contractor Testing

The Contractor may conduct his own air monitoring and laboratory testing to determine airborne fiber counts both inside and outside the work area. The cost of such air monitoring and laboratory testing will be at the Contractor's expense.

C. Contractor Personal Monitoring

The Contractor shall perform air monitoring as required to meet OSHA requirements for maintenance of Time Weighted Average (TWA) fiber counts for types of respiratory protection provided. Data from this sampling will be provided to owner's representative verbally, on a daily basis to verify adequate respiratory protection. A complete record of all air monitoring and results will be provided to the owner's representative on laboratory letterhead on a weekly basis. Contractor must retain unused portions of all samples until project closeout (Section 0200).

The owner's representative has the right to perform personnel monitoring whenever it is considered necessary to document exposures to the workers and/or the general public. Personnel air monitoring may be used to supplement area monitoring inside the enclosure but may not be used in lieu of area monitoring required inside the enclosure.

D. Authority to Stop Job Activities

The owner's representative shall have the authority to stop any job activities that are not being performed satisfactorily or in accordance with applicable regulations and the requirements of this specification, without additional charges by the Contractor to the

owner's representative, or the Building Owner. This shall not relieve the Contractor from liability for violating these regulations or guidelines. The owner's representative is relying on the Contractor's expertise in the abatement of asbestos-containing waste materials. The Contractor shall be responsible for knowing these laws and regulations, and shall, at all times, comply with them.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0140 – TEMPORARY FACILITIES AND UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

The Contractor shall provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.

PART 2 – PRODUCTS

2.1 PRODUCTS

A. Materials and Equipment

The Contractor shall provide new or used materials and equipment that are undamaged and in serviceable condition. The Contractor shall provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

1. Scaffolding

- a. Provide all scaffolding, ladders and/or staging, etc., as necessary to accomplish the work of this contract. Scaffolding may be of suspension type, or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.
- b. Equip rungs of all metal ladders, etc., with an abrasive non-slip surface.
- c. Provide a nonskid surface on all scaffold surfaces subject to foot traffic.

2. Water Service

- a. Temporary Water Service Connection: All connections to the water system shall be at a location designated by the owner's representative and shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to a drain or located over an existing sink or grade so that water will not damage existing finishes or equipment.

- b. Water Hoses: Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each work area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

3. Electrical Service

- a. General: Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.
- b. Temporary Power: Provide service from a distribution panel designated by the owner's representative. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.
- c. Voltage Differences: Provide identification warning signs at power outlets which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets.
- d. Ground Fault Protection: Provide all receptacle outlets equipped with ground fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.
- e. Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.
- f. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage indicated or required for adequate illumination. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

4. First Aid

First Aid Supplies: Comply with governing regulations and recognized recommendations within the construction industry. This is to be included in Contractors Health and Safety Plan.

PART 3 – EXECUTION

3.1 EXECUTION

- A. General:** Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work. Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

1. Scaffolding

- a. During the erection and/or moving of scaffolding, care must be exercised so that the polyethylene floor covering is not damaged.
- b. Clean as necessary debris from non-slip surfaces.
- c. At the completion of abatement work, clean all construction aids within the work area, wrap in one layer of 6-mil polyethylene sheet and seal before removal from the work area.

2. Water Service

- a. General: Provide temporary water connections (at Contractor's expense) to a potable water supply. Supply hot and cold water to the Decontamination System in accordance with Section 0185.
- b. Maintain hose connections and outlet valves in leak proof condition. Where spillage or leakage might damage finish work below an outlet, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates.

3. Electrical Service

- a. General: Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work.
 - i. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general, run wiring

overhead, and rise vertically where wiring will be least exposed to damage from construction operations.

- ii. Ground Fault Circuit Interrupters (GFCI) shall protect all electrical power used in work areas.

4. Temporary Lighting

- a. Provide lighting where natural lighting or existing building lighting does not meet the adequate light level:
- b. Provide lighting in the Decontamination Unit as required.

5. Temporary Heat

- a. General: Provide temporary heat where indicated or needed for performance of the Work.
- b. Maintain a minimum temperature of 70 degrees F in the shower area of the decontamination unit.

6. Fire Extinguishers

Comply with the applicable recommendations of NFPA Standard 10 - "Standard for Portable Fire Extinguishers." Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each Work Area, in Equipment Room, and one outside Work Area (or 5000 feet of work area) in Clean Room.

7. Sanitary Facilities

If necessary, the Contractor will provide one self-contained chemical toilet unit outside the work area for each 10 workers. Facilities shall be maintained throughout the duration of the site work.

SECTION 0145 – NEGATIVE PRESSURE SYSTEMS

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Submittal Requirements

Before start of work, the Contractor shall submit design of negative air system to the Owner's representative for review. The Contractor shall not begin work until the submittal is returned with the Owner's representative's action stamp indicating that the submittal has been approved for unrestricted use. The Contractor shall include in the submittal, at a minimum, the following:

1. Number of air filtration devices (AFD) required to meet the 4 air changes/hour and the calculations necessary to determine the number of machines.
2. Description of projected air flow within work area and methods required to provide adequate air flow in all portions of the work area.
3. Description of methods of testing for correct airflow and pressure differentials.
4. Manufacturer's product data on the machines to be used and date verification of HEPA filters employed.
5. Location of the machines in the work space.
6. Method of supplying adequate power to the machines and designation of building electrical panel(s) which will be supplying the power.
7. Description of work practices to insure that airborne fibers travel downstream from workers.
8. Manufacturer's product data on equipment used to monitor pressure differential between inside and outside of work area.

B. Quality Assurance

The Contractor shall field test HEPA filters daily by smoke detection method to confirm proper operation.

The Contractor shall monitor pressure differential across Decontamination Unit by smoke detection method on a daily basis.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Negative Air Filtration Devices (AFD) - General:** The Contractor shall supply the required number of AFD units to the site in accordance with these specifications. Each unit shall include the following:
1. Cabinet: Constructed of steel or other durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches to fit through standard-size doorways. Cabinet shall be factory sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance. Access to and replacement of all air filters shall be from intake end. Unit shall be mounted on casters or wheels.
 2. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions.
 3. HEPA Filters: The final filter shall be the HEPA type. The filter media (folded into closely pleated panels) must be completely sealed on all edges with a structurally rigid frame.
 - a. A continuous rubber gasket shall be located between the filter and the filter housing to form a tight seal.
 - b. Each filter shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles. Each filter shall bear a UL586 label to indicate ability to perform under specified conditions.
 - c. Each filter shall be marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
 4. Prefilters: The prefilters protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of prefiltration are required. The first-stage prefilter shall be a low-efficiency type (e.g., for particles 10 um and larger). The second-stage (or intermediate) filter shall have a medium efficiency (e.g., effective for particles down to 5 um). Prefilters and intermediate filters shall be installed either on or in the intake grid of the unit and held in place with special housings or clamps.

5. Instrumentation: Each unit shall be equipped with a manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed. A table indicating the usable air-handling capacity for various static pressure readings on the manometer shall be affixed near the gauge for reference, or the manometer reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) air delivery at that point. Provide units equipped with an elapsed time meter to show the total accumulated hours of operation.
6. Safety and Warning Devices: The unit shall have an electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter. Units shall be equipped with automatic shutdown system to stop fan in the event of a major rupture in the HEPA filter or blocked air discharge. Warning lights are required to indicate normal operation, too high a pressure drop across the filters (i.e., filter overloading), and too low of a pressure drop (i.e., major rupture in HEPA filter or obstructed discharge).
7. Approved Electrical Components: The electrical components shall be approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit shall be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet shall be grounded.

PART 3 – EXECUTION

3.1 GENERAL

A. Pressure Differential

Provide a fully operational negative air system within the work area maintaining continuously a pressure differential across work area. Demonstrate to the Owner's representative the pressure differential by use of smoke tube testing.

B. Monitoring

At the beginning and end of each work day, test the pressure differential between the work area and the outside of the building by use of smoke tube testing.

C. Air Movement Calculations

Determine the number of AFD Units needed to achieve four air change/hour rate. Capacity of a unit for purposes of this section is the capacity in cubic feet per minute with fully loaded filters (pressure differential which causes loaded filter warning light to

come on) in the machines labeled operating characteristics (assume 75% operating efficiency).

Number of AFDs needed:

Ventilation Requirement (CFM)

Capacity of Unit with Loaded Filters (CFM) x 0.75

Have available a minimum of one (1) additional unit as a backup in case of equipment failure or machine shutdown for filter changing.

D. Location of AFD Units

Locate the AFD unit(s) so that makeup air enters work area primarily through supplemental makeup air inlets and decontamination facilities, and traverses work area as much as possible. This may be accomplished by positioning the exhaust unit(s) at a maximum distance from the worker access opening or other makeup air sources.

E. Venting

Vent to the outside of the building.

F. Supplemental Makeup Air Inlets

Provide where required for proper air flow through the work space in locations approved by the owner's representative dampered inlets that allow air from outside the building into the work area. Locate makeup air inlets as needed to achieve air flow across work area. Cover air inlets with flaps to reseal automatically if the negative pressure system should shut down for any reason.

G. Electrical Service

Each AFD unit shall be serviced by a dedicated circuit with overload device tied into an existing building electrical panel which has sufficient spare capacity to accommodate the load. All electrical supply to the work areas will be protected by a Ground Fault Circuit Interrupter (GFCI).

H. Testing the System

Test negative pressure system before any asbestos-containing material is wetted or removed. After the work area has been prepared, the decontamination facility set up, and the exhaust unit(s) installed, start the unit(s) (one at a time). Demonstrate operation and testing of negative pressure system, air flow and pressure differential to the Owner's representative:

1. Plastic barriers and sheeting move lightly in toward work area,
2. Curtain of decontamination units move lightly in toward work area,
3. There is a noticeable movement of air through the decontamination unit. Use smoke tube daily to demonstrate air movement from Clean Room to Shower Room, from Shower Room to Vacuum Zone, and from Vacuum Zone to Work Area,
4. Use smoke tubes to demonstrate a positive motion of air across all areas in which work is to be performed.

I. Negative Pressure System

Modify the negative pressure system as necessary to successfully demonstrate the above.

J. Use of System during Abatement Operations

1. Start AFD units before beginning work (before any asbestos-containing material is disturbed). After abatement work has begun, run units continuously to maintain a constant negative pressure until decontamination of the work area is complete.
2. Do not shut down negative air system during encapsulating procedures, unless authorized by the Owner's representative in writing.
3. Start abatement work at a location farthest from the AFD units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and AFD units are operating again.
4. At completion of abatement work, allow AFD units to run as specified under Section 0190, to remove airborne fibers that may have been generated during abatement work and cleanup and to purge the work area with clean makeup air. The units may be required to run for a longer time after decontamination if dry or only partially wetted asbestos material was encountered during any abatement work.

K. Dismantling the System

When the final inspection and the results of final air tests indicate that the area has been decontaminated, AFD exhaust units shall be removed from the work area. Before removal from the work area, remove and properly dispose of pre-filter, and seal intake to the AFDs with 6-mil polyethylene to prevent environmental contamination from the filters.

SECTION 0150 – LOCAL AREA PROTECTION

PART 1 – GENERAL

1.1 DESCRIPTION

The local area is any area adjacent to the work area that is affected by this project. It includes:

- Adjacent buildings
- Staging and storage areas
- Areas isolated by critical barrier

1.2 SUBMITTALS

- A. Standard Operating Procedures
- B. Safety Plan with emergency phone numbers of fire department, rescue, hospital and ambulance services

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 GENERAL

- A. Contact the fire control agencies to review procedures prior to start of work.
- B. Contact the hospital facility to review procedures prior to start of work.

SECTION 0158 – FLOOR TILE AND MASTIC REMOVAL

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. Meet the requirements of Federal, State and Local regulations. A minimum of two certified asbestos workers shall perform the abatement of asbestos containing floor tiles and mastics in compliance with OSHA 29 CFR 1926.1101.
- B. Identify with Consultant all existing damages to property and/or equipment in the work area and record extent of damage prior to commencement of work.
- C. Isolate (totally) the asbestos abatement area from the rest of the building.
- D. Permit access to work area only through the decontamination system.
- E. Construct temporary walls (if necessary) using 2' x 4' framework and 6-mil sheeting to enclose the area. The existing walls shall also be protected using 6-mil poly sheeting.
- F. Identify with the owner's representative all equipment that must remain in operation within the work area. Isolate such equipment so that continued operation will not damage it or spread contamination.
- G. Individually clean and seal all light fixtures, non-asbestos piping, doorways, windows, and any other non-portable items. All non-portable items that must remain in the work area will be cleaned and covered with two layers of 6-mil poly sheeting and sealed with duct tape.
- H. Individually clean and seal all openings to other spaces, including penetrations through slabs, empty holes, holes accommodating cable, pipe, conduit, etc. with 6-mil poly held securely in place with duct tape. For smaller openings, silicone caulk firestop and expanding foam may be used.
- I. A three-chambered decontamination system shall be installed with two layers of polyethylene sheeting and standard triple-flapped polyethylene curtains separating the work zone, the decon chambers, and the clean room.
- J. Air filtration devices shall be installed using HEPA filters to provide negative air and to prevent the accumulation of airborne fibers per Section 0145 – Negative Pressure Systems. A minimum of four (4) air changes per hour will be required for the work space.
- K. A pre-abatement inspection shall be conducted by the owner's representative and written authorization shall be given to the Contractor. If authorization is not given, a "punch list"

of discrepancies shall be provided to the Contractor to be cleared before written authorization is given to start work.

- L. Workers shall wear double tyveks with no street clothing underneath. When exiting the work area, workers shall remove the outside tyvek suit in the work zone, step into the first decon chamber and remove the inside tyvek suit. The worker will be able to enter the second chamber and exit the decon unit. Respiratory protection shall be worn in accordance with OSHA 29 CFR 1926.1101 - Respiratory Protection for Asbestos.
- M. ACM to be removed within limited containment shall be thoroughly wetted with amended water prior to abatement and removed utilizing manual methods.
- N. If any breaches in the containment occur, all work inside shall stop and the containment shall be repaired before recommencing abatement.
- O. The Asbestos Abatement Contractor shall request a pre-sealant inspection by the owner's representative when all visible ACM is removed from the work area and surface cleaning (Section 0190) has been performed. If the visual inspection is unacceptable, a "punch list" of discrepancies to be cleared will be provided before written authorization to proceed is given per Section 0190 - Project Decontamination.
- P. When written authorization has been given, the entire work area shall be sprayed with an approved encapsulant prior to clearance air sampling.
- Q. Clearance air sampling shall be conducted by the owner's representative in accordance with Section 0135 - Test Laboratory Services and Section 0195 - Work Area Clearance. Upon receipt of work area clearance results, the Contractor shall complete the containment area per Section 0200 – Project Closeout.
- R. Upon receipt of acceptable work area clearance results, the Contractor shall complete the containment tear down and cleaning per Section 0200 – Project Closeout.
- S. All asbestos containing materials removed from the work area shall be properly bagged, labeled, and disposed as asbestos waste in an approved landfill. The Contractor shall provide all required manifests and receipts (Section 0230).

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0168 – EMERGENCY ASBESTOS WORK PROCEDURES

PART 1 – GENERAL

1.1 EMERGENCY ASBESTOS WORK PROCEDURES

- A. The Contractor shall meet all the requirements of Federal, State and local regulations.
- B. Emergency work procedures for disturbance of asbestos containing materials.
- C. If any asbestos containing materials are disturbed during the renovation process – the following procedures are to be implemented in order to decontaminate the area, protect the health and safety of the workers and dispose of the ACM in compliance with applicable regulations.
- D. Immediately isolate the room that contains the asbestos containing materials with a minimum of barrier tape and close all doors and/or ventilation systems to the area.
- E. Immediately contact a Missouri Licensed asbestos abatement contractor to perform an assessment and decontamination activities.
- F. Only certified asbestos workers/supervisors shall be permitted in the isolated area. This includes workers and supervisors coming into contact with asbestos contaminated materials.
- G. Personnel entering in the work area shall wear a minimum breathable disposable suit, half face negative pressure respirator with HEPA filters, safety glasses, hard hat, steel toe boots and appropriate hand protection. If necessary the workers shall also wear appropriate fall protection equipment.
- H. The material shall be sprayed with amended water to prevent any visible emissions and removed utilizing manual methods.
- I. Wet wipe and HEPA vacuum any visible debris and a site radius of 10 feet surrounding visible asbestos debris. All porous contaminated materials that can into contact with the asbestos shall be double bagged as asbestos waste.
- J. Air sampling shall be conducted by the owner’s representative in accordance with Section 0135 - Test Laboratory Services and Section 0195 - Work Area Clearance.
- K. All asbestos containing materials removed from the work area shall be properly bagged, labeled, and disposed as asbestos waste in an approved landfill. The Contractor shall provide all required manifests and receipts (Section 0230).

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0175 – WORKER PROTECTION

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

This section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection (refer to Section 0130 for requirements for Training and Medical Exam).

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. Protective Clothing

1. Coveralls: Provide disposable full-body coveralls, disposable underwear, and disposable head covers, and require that they be worn by all workers in the work area. Provide a sufficient number for all required changes for all workers in the work area, and a minimum of 3/day for visitors and regulatory officials.
2. Boots: Provide safety-toe footwear according to OSHA 1910.136 with non-skid soles that provide adequate foot protection for all workers. Do not allow boots to be removed from the work area after being contaminated with ACM unless thoroughly decontaminated.
3. Hard Hats: Provide head protection (hard hats) as required by OSHA 1910.135 for all workers. The environmental contractor shall provide several hard hats for visitors. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hard hats to remain in the work area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from work area at the end of the work.
4. Goggles: Provide eye protection (goggles) as required by OSHA 1910.133 for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury. Goggles are to remain in the work area until thoroughly decontaminated.
5. Gloves: Provide work gloves to all workers that provide adequate hand protection and require that they be worn at all times. Do not remove gloves from work area and dispose of as asbestos contaminated waste at the end of the work.

B. Additional Protective Equipment

Disposable coveralls, head covers, and footwear covers shall be provided by the Contractor for the Owner's representative and other authorized representatives who may inspect the job site.

PART 3 – EXECUTION

3.1 EXECUTION

A. General

Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The procedures herein are minimums to be adhered to regardless of fiber count in the work area.

B. Donning Protective Clothing

Each time work area is entered, remove all street clothes in the Changing Room of the Personnel Decontamination System and put on new disposable underwear, coverall, new head cover, booties and with appropriate respiratory protection.

C. Decontamination Procedures

1. Require all workers to adhere to the following personal decontamination procedures whenever they leave the work area:
2. Type C Supplied Air or Powered Air-Purifying Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:
 - a. When exiting area, remove disposable underwear, coveralls, disposable head covers, and disposable footwear covers or boots in the vacuum zone. Deposit in labeled 6-mil bag for disposal.
 - b. Using a HEPA vacuum, remove any debris adhering to body, hair, or respirator.
 - c. Still wearing respirators, proceed to showers. (If using supplied air respirator, disconnect from airline and properly protect supply line.) Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

- i. Thoroughly wet body including hair and face. If using a Powered Purifying Air-Respirator (PAPR), hold blower unit above head to keep canisters dry.
 - ii. With respirator face piece still in place, thoroughly wash body, hair, respirator face piece, and all parts of the respirator except the blower unit and battery pack on a PAPR. Pay particular attention to seal between face and respirator and under straps.
 - iii. Take a deep breath, hold it and/or exhale slowly, completely wet hair, face, and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.
 - iv. Carefully wash facepiece of respirator inside and out. If using PAPR: shut down in the following sequence, first cap inlets to filter cartridges, and then turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit). Thoroughly wash blower unit and hoses. Carefully wash battery pack with wet rag. Be extremely cautious of getting water in battery pack as this will short out and destroy battery.
 - v. Shower completely with soap and water.
 - vi. Rinse thoroughly.
 - vii. Rinse shower room walls and floor prior to exit.
 - d. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.
3. Air Purifying-Negative Pressure Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area with a half or full face cartridge type respirator:
 - a. When exiting area, remove disposable underwear, coveralls, disposable headcovers, and disposable footwear covers or boots in the vacuum zone. Deposit in labeled 6-mil bag for disposal.
 - b. Using a HEPA vacuum, remove any debris adhering to body, hair, or respirator.
 - c. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required as a minimum:
 - i. Thoroughly wet body from neck down.

- ii. Wet hair as thoroughly as possible without wetting the respirator filter is using air purifying type respirator.
 - iii. Take a deep breath, hold it and/or exhale slowly, complete wetting of hair thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breathe.
 - iv. Dispose of wet filters from air purifying respirator.
 - v. Carefully wash facepiece of respirator inside and out.
 - vi. Shower completely with soap and water.
 - vii. Rinse thoroughly.
 - viii. Rinse shower room walls and floor prior to exit.
- d. Proceed from shower to Changing Room and change into street clothes or into new disposable work items.
- D.** Require that workers NOT eat, drink, smoke, chew gum or tobacco in the work area. To eat, chew, drink or smoke, workers shall follow the procedure described above, and then dress in street clothes before entering the non-work areas of the building.

SECTION 0180 – RESPIRATORY PROTECTION

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Description of Work

Contractor will supply sufficient quantity of respiratory equipment.

1. Provide adequate protection against airborne concentrations of asbestos fibers, and;
2. Instruct and train each worker involved in asbestos abatement of ACM in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face, in the work area from the start of work until the work area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

B. Standards

Except to the extent that more stringent requirements are written directly into the Contract Documents, the following regulations and standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, meet the more stringent requirement. The following are incorporated:

OSHA - U.S. Department of Labor Occupational Safety and Health Administration, Safety and Health Standards 29 CFR 1910, Section 1001 and Section 1910.134. 29 CFR 1926.1101

CGA - Compressed Gas Association, Inc., New York, Pamphlet G-7, "Compressed Air for Human Respiration," and Specification G-7.1 "Commodity Specification for Air."

CSA - Canadian Standard Association, Rexdal, Ontario, Standard Z180.1-1978, "Compressed Breathing Air."

ANSI - American National Standard Practices for Respiratory Protection, ANSI Z88.2-1992.

NIOSH - National Institute for Occupational Safety and Health

MSHA - Mine Safety and Health Administration

C. Submittals

Before start of work, submit to the Owner's representative for review documents specifically outlining Contractor's respiratory protection plan, and a contingency plan to meet any elevated fiber concentrations. Do not begin work until these submittals are returned with the owner's representative's approval indicating that the submittal is returned for unrestricted use.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. Air Purifying Respirators

1. Respirator Bodies: Provide half face or full face type respirators. Equip full-face respirators with a nose cup or other anti-fogging device.
2. Filter Cartridges: Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification and color coded in accordance with ANSI Z88.2-1992.
3. Non-permitted respirators: Do not use single use, disposable or quarter face respirators.

B. Powered Air Purifying Respirators (Half or Full Face Mask)

1. Supply a sufficient quantity of high efficiency respirator filters approved for asbestos so that workers can change filters at any time that flow through the face piece decreases to the level at which the manufacturer recommends filter replacement.
2. Require that HEPA elements in filter cartridges be protected from wetting during showering.
3. Require entire exterior housing of respirator including blower unit, filter cartridges, hoses, battery pack, face mask, belt, and cords to be washed each time a worker leaves the work area.
4. Caution should be used to avoid shorting battery pack during washing.
5. Provide an extra battery pack for each respirator so that one can be charging while one is in use.

C. Supplied Air Respirator Systems

1. Provide air used for breathing in Type "C" supplied air respiratory systems that meet or exceed standards set for Grade D or CSA Z180.1, whichever presents the more stringent quality standard.
2. Provide air used for breathing in Type "C" supplied air respiratory systems that meet or exceed standards.
3. Provide equipment capable of producing air of the quality and volume required by the job site conditions and crew size. Comply with provisions of this specification if more stringent than the governing standard.
4. Face Piece and Hose: Provide full face piece and hose by same manufacturer that has been certified by NIOSH/MSHA as an approved Type "C" respirator assembly operating in pressure demand mode with a positive pressure face-piece.
5. Auxiliary backup system: In atmospheres which contain sufficient oxygen (greater than or equal to 19.5% oxygen) provide a pressure-demand full face piece supplied air respirator equipped with an emergency escape system.
6. Escape air supply: In atmospheres which are oxygen deficient (less than 19.5% oxygen) provide a pressure-demand full face piece supplied air respirator incorporating an auxiliary self-contained breathing apparatus (SCBA) which automatically maintains an uninterrupted air supply in pressure demand mode with a positive pressure face piece.
7. Backup air supply: Provide a reservoir of compressed air located outside the work area which will automatically maintain a continuous uninterruptible source of air available to each connected face piece and hose assembly in the event of compressor shut-down, contamination of air delivered by compressor, power loss or other failure. Provide sufficient capacity in the back-up air supply to allow a minimum escape time of five minutes.
8. Warning device: Provide a warning device that will operate independently of the building's power supply. Locate so that alarm is clearly audible above the noise level produced by equipment and work procedures in use, in all parts of the work area and at the compressor. Connect alarm to warn of:
 - a. Compressor shut down or other fault requiring use of backup air supply,
 - b. Carbon Monoxide (CO) levels in excess of 5 ppm by volume.

9. Carbon Monoxide (CO) Monitor: Continuously monitor and record CO levels. Place monitors in the air line between compressor and backup air supply and between backup air supply and workers. Connect monitors so that they also sound an alarm as specified under "Warning Devices."
10. Compressor Shut Down: Interconnect monitors, alarms and compressor so that compressor is automatically shut down and the alarms sound if any of the following occur:
 - a. CO concentrations exceed 5 ppm/v in the air line between the filter bank and backup air supply,
 - b. Compressor temperature exceeds normal operating range.
11. Compressor Location: Locate compressor in a location that will supply air free of contaminants, and will not impede access to the building, and that will not cause a nuisance by virtue of noise or fumes to occupied portions of the building.
12. Air Intake: Locate air intake remotely from any source of automobile exhaust, any exhaust from motors, or buildings and other airborne contaminants.
13. After Cooler: Provide an after cooler at entry to filter system which is capable of reducing temperatures to outside ambient air temperatures.
14. Self Contained Breathing Apparatus (SCBA): Configure system to permit the recharging of 1/2 hour 2260 PSI SCBA cylinders.

PART 3 – EXECUTION

3.1 EXECUTION

A. General

1. Respiratory Protection Program: Provide all personnel, authorized visitors and inspectors with respiratory protective equipment approved by OSHA and NIOSH. Comply with ANSI Z88.2-1992. "Practices for Respiratory Protection" and OSHA 29 CFR 1910 and 1926. Respirators will be approved by NIOSH.
2. Require that a respirator be worn by anyone in a work area at all times, regardless of activity, until the area has been cleared for re-occupancy in accordance with Section 0195.
3. Regardless of Airborne Fiber Levels: Require that the minimum level of respiratory protection used be half-face air-purifying respirator with high efficiency filters.

B. Fit Testing

1. All respirator wearers shall have a current fit test on the respirators he/she uses, using one of the protocols listed in Appendix C of OSHA. The fit tests must have been performed within the past year.
2. Upon each wearing: Require that each time an air-purifying respirator is put on, it be checked for fit with a positive or negative pressure fit test in accordance with the manufacturer's instructions of ANSI Z88.2-1992.
3. Personnel wearing respiratory protection must have no facial hair that would interfere with the face to facepiece seal of the respirator.

SECTION 0190 – PROJECT DECONTAMINATION

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Decontamination of the Work Area

1. The work consists of cleaning of the work barrier plastic, cleaning of the room surfaces to remove any contamination, and trace fiber fixation of all surfaces.
2. When in a limited-containment enclosure, the amount of equipment, furniture, material and surface cleaning will depend upon debris visible and condition of material before start of abatement. Where there is visible debris present and/or poor material condition, a surface cleaning will be mandatory. Visible debris and material condition has been evaluated and is specified in site work.

B. Operation of the Negative Pressure System

Operation of the negative pressure system is to continue through the Project Decontamination phase to remove airborne fibers generate by the work.

C. Work Area Clearance

Air testing and other requirements which must be met before release of Contractor and reoccupancy of the work area are specified in Sections 0135 and 0195.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 GENERAL

Work of this section includes the decontamination of surfaces and air in the Work Area which have been, or may have been, contaminated by elevated airborne asbestos fiber levels generated during abatement activities.

A. First Cleaning

1. First Cleaning: After removal of all asbestos materials, asbestos-contaminated materials and debris from the work area and receiving authorization from the Owner's representative, the Contractor should perform a cleaning of all surfaces of the work area including remaining sheeting, tools, and scaffolding by use of

damp-cleaning and mopping, and/or a HEPA filtered vacuum. Do not perform dry dusting or dry sweeping. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.

2. Perform a complete visual inspection of the entire work area including: decontamination unit, all plastic sheeting, seals over ventilation openings, doorways, windows, and other openings; look for debris from any sources, residue on surfaces, dust or other matter. If any such debris, residue, dust or other matter is found, repeat cleaning procedures and continue decontamination procedure. When the area is visually clean, complete the certification at the end of this section. If visual inspection reveals areas that are not sufficiently clean, the Owner's representative will prepare a "punch list" of tasks that need to be completed. Visual inspection is not complete until confirmed in writing by the Owner's representative.

B. Encapsulation

1. After receiving authorization from Owner's representative to perform trace fiber fixation of surfaces, encapsulation shall be performed. Maintain negative air system in operation during encapsulation work.
2. Following the application of trace fiber fixation material and receiving approval of Owner's representative, remove all working barrier sheeting and equipment decontamination unit, leaving only the following:
 - a. Critical Barrier: which forms the sole barrier between the work area and other portions of the building or the outside.
 - b. Critical Barrier Sheeting: over lighting fixtures and clocks, ventilation openings, doorways, convectors, speakers and other openings.
 - c. Decontamination unit: for personnel in operating condition.
 - d. Negative Pressure System: maintain in continuous operation.

B. Air Sampling

1. Phase Contrast Microscopy (PCM) for the ACM removal in work area: After the work area is found to be visually clean, PCM clearance samples will be taken and analyzed in accordance with procedures for PCM analysis.
 - a. If the results of all PCM clearance samples are less than .010 fibers / cubic centimeter, the Contractor can then proceed with work area clearance procedures specified in Section 0195.

C. Completion of Abatement Work

Asbestos abatement work is complete upon meeting the PCM work area clearance criteria specified in Section 0195.

1. Remove equipment, materials from the work area.
2. Dispose of all asbestos containing waste material as specified in Section 0230.

If the abatement area does not pass the PCM work area clearance criteria, repeat cleaning procedures. The Contractor may take the PCM clearance samples that are above the clearance criteria and have them analyzed by Transmission Electron Microscopy (TEM) at the Contractor's expense. The clearance criteria for TEM samples shall be 70 structures / square millimeter. All TEM samples shall pass these clearance criteria.

D. Certificate of Visual Inspection

Following this section is a "Certificate of Visual Inspection." This certification is to be completed by the Contractor and certified by the Owner's representative.

SECTION 0195 – WORK AREA CLEARANCE CRITERIA

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

The work is completed when the work area is visually clean and airborne fiber concentrations are less than .010 fibers / cubic centimeter.

1.2 AGGRESSIVE SAMPLING

Before sampling pumps are started, the exhaust from a leaf-blower (with an approximate 1-horsepower electric motor) will be swept against all walls, ceilings, floors, ledges and other surfaces in the room. All final clearance samples shall be collected under dry conditions using aggressive techniques. Aggressive techniques should be conducted in accordance with Appendix M of the 1985 United States Environmental Protection Agency document *“Guidance for Controlling Asbestos-Containing Materials in Buildings”* (the Purple Book). All barriers, except critical barriers, shall be removed for final clearance, unless the abatement area is not isolated from adjacent areas, or aggressive techniques are likely to contaminate adjacent areas.

1.3 AIR SAMPLING

A. Phase Contrast Microscopy (PCM)

A minimum of five clearance samples shall be collected for each area clearance when the activities involve gross abatement of friable materials. For gross abatement areas greater than 5,000 square feet or 50,000 cubic feet, an additional sample is required for each additional 2,500 square feet or 25,000 cubic feet, whichever is more stringent (e.g., an enclosure of 10,000 square feet or 100,000 cubic feet would require 7 clearance samples).

For abatement activities involving limited quantities of friable materials (such as glove bag removal) or abatement of non-friable materials a minimum of two in-progress final air samples shall be collected.

B. Release Criteria

Decontamination of the work site is completed when all air samples are less than 0.010 fiber / cubic centimeters.

If the abatement area does not pass the PCM work area clearance criteria, repeat cleaning procedures. The Contractor may take the PCM clearance samples that are above the clearance criteria and have them analyzed by Transmission Electron

Microscopy (TEM) at the Contractor's expense. The clearance criteria for TEM samples shall be 70 structures / square millimeter. All TEM samples shall pass these clearance criteria.

If release criteria are met, remove the critical barriers separating the work area from the rest of the building and shut down negative pressure system (when necessary). Air filtration device intakes are to be completely sealed with 6-mil poly before moving to prevent discharge of embedded fibers.

1.4 LABORATORY TESTING

A. Phase Contract Microscopy (PCM)

The services of testing laboratory will be employed by the Owner to perform laboratory analysis of the daily air samples. A technician will be at the job site; samples will be sent daily so that verbal reports on air samples can be obtained by the morning of the third day following sample collection.

B. Reporting

A complete record certified by the testing laboratory, of all air monitoring tests and results will be furnished to the Owner, Owner's representative and the Contractor.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0200 – PROJECT CLOSEOUT

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. Definitions:** Project closeout is the term used to describe certain collective project requirements, indicating completion of the Work, that are to be fulfilled near the end of the Contract time in preparation for final acceptance and occupancy by the Owner, as well as final payment to the Contractor and the normal termination of the Contract.
- B. Inspection Procedures:** Upon receipt of Contractor's request for inspection, the Owner's representative will either proceed with inspection or advise Contractor of unfulfilled prerequisites.
1. Following initial inspection, owner's representative will either prepare the certificate of substantial completion, or will advise Contractor of work that must be performed before the certificate will be issued. The Owner's representative will repeat the inspection when requested and when assured that the Work has been substantially completed.
 2. Results of the completed inspection will form the initial "punch-list" of tasks needed to be completed for final acceptance.
- C. Reinspection Procedure:** The Owner's representative will reinspect the Work upon receipt of the Contractor's notice that the work, including the punch-list items resulting from earlier inspections, has been completed, except for those items whose completion has been delayed because of circumstances that are acceptable to the owner's representative.
1. Upon completion of reinspection, the owner's representative will either prepare a certificate of final acceptance, or will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance.
 2. If necessary, the reinspection procedure will be repeated. A fee will be credited to the building owner to pay for the owner's representative's services for each additional re-inspection.
- D. Record Specifications:** Maintain one complete copy of the Project Manual, including specifications and addenda, and one copy of other written construction documents such as change orders and similar modifications issued in printed form during construction. Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications as issued.

Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable. Upon completion of the work, submit record specifications to the Owner's representative.

- D. Record Product Data:** Maintain one copy of each product data submittal. Mark these documents to show significant variations in the actual Work performed in comparison with the submitted information. Include both variations in the products as delivered to the site, and variations from the manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work, which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications. Upon Completion of mark-up, submit complete set of record product data to the Owner's representative.
- E. Record Sample Submittal:** Immediately prior to date or dates of substantial completion, the Contractor shall meet at the site with the Owner's representative and the owner's personnel, if desired, to determine which, if any, of the submitted samples that have been maintained by the Contractor during progress of the Work, are to be transmitted to the owner for record purposes. Comply with delivery to the Owner's sample storage space.
- F. Miscellaneous Record Submittals:** Refer to other sections of these specifications for requirements of miscellaneous recordkeeping and submittals in connection with the actual performance of the Work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Owner's representative for the owner's records.
- G. Post Notifications:** Prepare and transmit necessary post-project notifications to regulatory agencies.
- H. Project Closeout Documentation:** The Contractor shall provide copies of asbestos manifests, miscellaneous hazardous waste manifests, and bills of lading and manifests, results of any characterization analyses, all terminated bills of lading and manifests, CFC's reclamation documentation, CFC's used refrigerated agreement from cylinder disposal facility, daily logs, containment sign-in sheets, asbestos certifications/medical/fit test of all workers, asbestos worker certifications, OSHA air sampling results, copies of all revisions to notifications, post notification and daily sign-in sheets. The closeout documentation shall be provided to the owner's representative as soon as possible after the completion of the environmental work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 CLEANING

- A.** Provide post clearance cleaning of the Work after written approval of satisfactory completion. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions for operations.
1. Complete the following cleaning operations before requesting the owner's representative's inspection for certification of substantial completion.
 2. Clean exposed hard-surfaced finishes affected by the work, to a dirt-free condition, free of dust, stains, films and similar distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
- B. Removal of Protection:** Except as otherwise indicated or requested by the owner's representative, remove temporary protection devices and facilities which were installed during the course of the work to protect previously completed work during the remainder of the construction period.
- C. Repair/Replacement of Damaged Materials:** Repair or replace any damaged materials, surfaces, equipment, insulation, finishes or other items.
- D. Compliance:** Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the site. Do not bury debris or excess materials on the owner's property unless specific written approval is granted by owner or owner's representative. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

SECTION 0205 - COMMENCEMENT OF WORK

PART 1 – GENERAL

1.1 COMMENCEMENT OF WORK

The Contractor shall not commence work unless the following requirements have been met. These requirements must be met each time abatement work is to begin in a new work area.

A. Enclosure Systems

The specified enclosure systems have been constructed, tested and approved.

B. Ventilation Systems

The specified ventilation systems are functioning adequately and have been periodically tested using smoke detection method for one (1) hour (see Section 0145).

C. Submissions

All pre-abatement submissions, notifications, posting and permits have been provided and are satisfactory to the Owner's representative.

D. Equipment

All equipment for abatement, cleanup and disposal are on hand.

E. Training

All worker training (and certification) is completed.

F. Written Permission

Contractor received written permission from the owner's representative.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0210 – DIFFERING SITE CONDITIONS

PART 1 – GENERAL

1.1 DESCRIPTION

Amounts and locations of ACM have been field surveyed to confirm its presence. The Contractor is responsible to field verify locations, amounts and conditions. Linear and square footage and number of fittings are approximations based on the field survey.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 0230 – ASBESTOS WASTE HANDLING

PART 1 – GENERAL

1.1 ASBESTOS PACKAGING AND STORAGE

- A. Asbestos waste shall be double-bagged in 6-mil asbestos-labeled polyethylene bags and individually sealed airtight with duct tape. Materials which are likely to puncture 6-mil bags are to be packaged by other means to ensure seal integrity.
- B. Disposal material shall be HEPA-vacuumed and/or wet wiped in the work area to remove gross contamination before transporting to the decontamination area.
- C. Disposal containers will then be decontaminated with a fine water spray and wet-wiped in the equipment decontamination area.
- D. Containers which have been thoroughly cleaned will be passed through the air locks of the equipment decontamination area into the clean zone.
- E. All ACM removed from the work area shall be properly bagged, labeled, and disposed as special waste in an approved landfill.
- F. Disposal material shall not be stored outside the designated staging area. Bags from the work area shall be taken directly to an enclosed truck or dumpster. Bagged asbestos shall not be transported in open trucks. Damaged bags or bags containing sharp materials that will puncture the containment bag must be contained in rigid containers (i.e. fiber drums). Drums shall be labeled with the same warning as the bags. Uncontaminated drums may be reused. Drums that have been contaminated as asbestos-containing waste shall be disposed in accordance with this specification and applicable regulations.
- G. At the burial site, sealed plastic bags shall be carefully removed from the truck in a manner to prevent rupturing the bags. Personnel involved in the unloading of ACM bags must wear personal protective gear including respiratory protection. ACM bags shall be covered with suitable material immediately after receipt in the landfill.
- H. A copy of the completed waste manifest, chain of custody form and landfill receipt will be provided to the owner's representative by the Contractor as soon as they are available.
- I. All ACM disposal containers shall be labeled in accordance with OSHA and DOT requirements.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

SECTION 030130 - MAINTENANCE OF CAST-IN-PLACE CONCRETE

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. Removal of deteriorated concrete and subsequent replacement and patching.
 - 2. Floor joint repair.
 - 3. Polymer sealers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.
 - 2.
- B. Samples for Verification: Cured Samples for each exposed product and for each color and texture specified.
 - 1. Include Samples of each required type, color, and texture of patching material in the form of patches in drilled holes or sawed joints in sample concrete representative of the range of concrete colors on the building.
 - 2. Include Samples of each required type, color, and texture of polymer-sealer material in the form of cementitious tiles at least 8 inches (200 mm) long by 8 inches (200 mm) wide.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For concrete-maintenance specialist and manufacturers.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Each manufactured bonding-agent, packaged patching-mortar, joint-filler and polymer-sealer manufacturer shall employ factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- B. Store cementitious materials off the ground, under cover, and in a dry location.
- C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

1.7 FIELD CONDITIONS

- A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.
 - 1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F (5 deg C) within eight hours.
 - 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F (16 deg C) within eight hours.
 - 3. Use only Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F (16 deg C) for eight hours.
- B. Cold-Weather Requirements for Cementitious Materials: Do not apply unless concrete-surface and air temperatures are above 40 deg F (5 deg C) and will remain so for at least 48 hours after completion of Work.
- C. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F (32 deg C) and above.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

2.2 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Manufactured product that consists of water-insensitive epoxy adhesive, portland cement, and water-based

solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.

- B. Epoxy Bonding Agent: ASTM C881/C881M, bonding system Type II and free of VOCs.
- C. Latex Bonding Agent, Redispersible: ASTM C1059/C1059M, Type I for use at nonstructural and interior locations unless otherwise indicated.
- D. Mortar Scrub Coat: Mix consisting of 1 part portland cement and 1 part fine aggregate complying with ASTM C144 except 100 percent passing a No. 16 (1.18-mm) sieve.

2.3 PATCHING MORTAR

A. Patching Mortar Requirements:

- 1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
- 2. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend several aggregates if necessary to achieve suitable matches.

B. Job-Mixed Patching Mortar: 1 part portland cement and 2-1/2 parts fine aggregate complying with ASTM C144, except 100 percent passing a No. 16 (1.18-mm) sieve.

C. Cementitious Patching Mortar: Packaged, dry mix for repair of concrete.

- 1. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C109/C109M.

D. Rapid-Strengthening, Cementitious Patching Mortar: Packaged, dry mix, ASTM C928/C928M for repair of concrete.

- 1. Compressive Strength: Not less than 4000 psi (27.6 MPa) within three hours when tested according to ASTM C109/C109M.

2.4 JOINT FILLER

A. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A Shore durometer hardness of at least 80 according to ASTM D2240.

B. Color: As selected by Architect from full range of industry colors.

2.5 POLYMER-SEALER MATERIALS

A. Epoxy Polymer Sealer: Low-viscosity epoxy, penetrating sealer and crack filler recommended by manufacturer for penetrating and sealing cracks in concrete surfaces; free of VOCs

- 1. Color: As selected by Architect from full range of industry colors.

2.6 MISCELLANEOUS MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I, II, or III unless otherwise indicated.
- B. Water: Potable.

2.7 MIXES

- A. General: Mix products, in clean containers, according to manufacturer's written instructions.
 - 1. Do not add water, thinners, or additives unless recommended by manufacturer.
 - 2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
 - 3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.
- B. Mortar Scrub Coat: Mix dry ingredients with enough water to provide consistency of thick cream.
- C. Dry-Pack Mortar: Mix required type(s) of patching-mortar dry ingredients with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.

PART 3 - EXECUTION

3.1 CONCRETE MAINTENANCE

- A. Have concrete-maintenance work performed only by qualified concrete-maintenance specialist.
- B. Comply with manufacturers' written instructions for surface preparation and product application.

3.2 EXAMINATION

- A. Notify Architect seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.
- B. Locate areas of deteriorated or delaminated concrete using hammer or chain-drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries. At columns and walls make boundaries level and plumb unless otherwise indicated.

- C. Pachometer Testing: Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer using depth of cover measurements, and verify depth of cover in removal areas using pachometer.
- D. Perform surveys as the Work progresses to detect hazards resulting from concrete-maintenance work.

3.3 PREPARATION

- A. Ensure that supervisory personnel are on-site and on duty when concrete maintenance work begins and during its progress.
- B. Protect persons, motor vehicles, surrounding surfaces of building being repaired, building site, plants, and surrounding buildings from harm resulting from concrete maintenance work.
 - 1. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
 - 2. Use only proven protection methods appropriate to each area and surface being protected.
 - 3. Provide temporary barricades, barriers, and directional signage to exclude public from areas where concrete maintenance work is being performed.
 - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of concrete maintenance work.
 - 5. Contain dust and debris generated by concrete maintenance work and prevent it from reaching the public or adjacent surfaces.
 - 6. Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
 - 7. Protect floors and other surfaces along haul routes from damage, wear, and staining.
 - 8. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.
 - 9. Protect adjacent surfaces and equipment by covering them with heavy polyethylene film and waterproof masking tape or a liquid strippable masking agent. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
 - 10. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 - 11. Dispose of debris and runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- C. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.

1. Prevent solids such as aggregate or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from concrete maintenance work.
 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
- D. Preparation for Concrete Removal: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.
1. Verify that affected utilities have been disconnected and capped.
 2. Inventory and record the condition of items to be removed for reinstallation or salvage.
 3. Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain. Strengthen or add new supports when required during progress of removal work.
- E. Reinforcing-Bar Preparation: Remove loose and flaking rust from exposed reinforcing bars by high-pressure water cleaning, abrasive blast cleaning, needle scaling or wire brushing until only tightly adhered light rust remains.
1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in two or more adjacent bars, cut bars and remove and replace as indicated on Drawings.
 2. Remove additional concrete as necessary to provide at least 3/4-inch (19-mm) clearance at existing and replacement bars.
 3. Splice replacement bars to existing bars according to ACI 318 (ACI 318M) by lapping, welding, or using mechanical couplings.
- F. Preparation of Floor Joints for Repair: Saw-cut joints full width to edges and depth of spalls, but not less than 3/4 inch (19 mm) deep. Clean out debris and loose concrete; vacuum or blow clear with compressed air.
- G. Surface Preparation for Corrosion-Inhibiting Treatment: Clean concrete to remove dirt, oils, films, and other materials detrimental to treatment application.
1. Use low-pressure water cleaning, detergent scrubbing or sand blasting.
 2. Allow surface to dry before applying corrosion-inhibiting treatment.
- H. Acidic Surface Preparation for Sealers: Acid etch surface of concrete to produce a surface profile matching CSP 1 according to ICRI 310.2. Prepare surface for acid etching by detergent scrubbing to remove oils and films that may prevent acid penetration.
1. Remove excess acid solution, reaction products, and debris by squeegeeing or vacuuming.
 2. Scrub surface with an alkaline detergent, rinse, and squeegee or vacuum.

3. Check acidity of surface with pH test paper and continue rinsing until pH is acceptable according to sealer manufacturer's written instructions.
 4. When pH is acceptable according to sealer manufacturer's written instructions and surface is clean, vacuum dry.
- I. Nonacidic Surface Preparation for Sealers: Clean concrete to remove dirt, oils, films, and other materials detrimental to sealer application.
1. Use shot blasting, low-pressure water cleaning or detergent scrubbing.

3.4 REMOVAL OF CONCRETE

- A. Do not overload structural elements with debris.
- B. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch (13 mm). Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.
- C. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
- D. Remove additional concrete if necessary to provide a depth of removal of at least 1/2 inch (13 mm) over entire removal area.
- E. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least 3/4-inch (19-mm) clearance around bar.
- F. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound and disbonded concrete is completely removed.
- G. Provide surfaces with a fractured profile of at least 1/8 inch (3 mm) that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level unless otherwise directed.
- H. Thoroughly clean removal areas of loose concrete, dust, and debris.

3.5 APPLICATION OF BONDING AGENT

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars and concrete by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete.
- B. Epoxy Bonding Agent: Apply to reinforcing bars and concrete by brush, roller, or spray according to manufacturer's written instructions, leaving no pinholes or other uncoated areas. Apply to reinforcing bars in at least two coats, allowing first coat to dry before

applying second coat. Place patching mortar or concrete while epoxy is still tacky. If epoxy dries, recoat before placing patching mortar or concrete.

- C. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing patching mortar or concrete.
- D. Latex Bonding Agent, Type II: Mix with portland cement and scrub into concrete surface according to manufacturer's written instructions. Place patching mortar or concrete while bonding agent is still wet. If bonding agent dries, recoat before placing patching mortar or concrete.
- E. Mortar Scrub Coat for Job-Mixed Patching Mortar and Concrete: Dampen repair area and surrounding concrete 6 inches (150 mm) beyond repair area. Remove standing water and apply scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar or concrete.
- F. Slurry Coat for Cementitious Patching Mortar: Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar mixed with latex bonding agent into substrate, filling pores and voids.

3.6 INSTALLATION OF PATCHING MORTAR

- A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer or where dry-pack mortar is indicated.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. General Placement: Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
- C. Vertical Patching: Place material in lifts of not more than 1 inch (25 mm). Do not feather edge.
- D. Overhead Patching: Place material in lifts of not more than 1 inch (25 mm). Do not feather edge.
- E. Consolidation: After each lift is placed, consolidate material and screed surface.
- F. Multiple Lifts: Where multiple lifts are used, score surface of lifts to provide a rough surface for placing subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
- G. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete.

- H. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.7 INSTALLATION OF DRY-PACK-MORTAR

- A. Use dry-pack mortar for deep cavities. Place as specified in this article unless otherwise recommended in writing by manufacturer.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. Place dry-pack mortar into cavity by hand, and compact tightly into place. Do not place more material at a time than can be properly compacted. Continue placing and compacting until patch is approximately level with surrounding surface.
- C. After cavity is filled and patch is compacted, trowel surface to match profile and finish of surrounding concrete. A thin coat of patching mortar may be troweled into the surface of patch to help obtain required finish.
- D. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.8 CONCRETE PLACEMENT

- A. Standard Placement: Place concrete by form-and-pump method unless otherwise indicated.
 - 1. Use vibrators to consolidate concrete as it is placed.
 - 2. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
- B. Form-and-Pump Placement: Place concrete by form-and-pump method where indicated.
 - 1. Design and construct forms to resist pumping pressure in addition to weight of wet concrete. Seal joints and seams in forms and where forms abut existing concrete.
 - 2. Pump concrete into place from bottom to top, releasing air from forms as concrete is introduced. When formed space is full, close air vents and pressurize to 14 psi (96 kPa).
- C. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
- D. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.

3.9 FLOOR-JOINT REPAIR

- A. Cut out deteriorated concrete and reconstruct sides of joint with patching mortar as indicated on Drawings. Install joint filler in nonmoving floor joints where indicated and as specified in this article.
- B. Depth: Install joint filler to a depth of at least 3/4 inch (19 mm). Use fine silica sand no more than 1/4 inch (6 mm) deep to close base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
- C. Top Surface: Install joint filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.

3.10 APPLICATION OF POLYMER SEALER

- A. Apply polymer sealer by brush, roller, or airless spray at manufacturer's recommended application rate.

END OF SECTION 030130

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing bars.
2. Welded wire fabric.
3. Reinforcement accessories.

1.2 SUBMITTALS

A. Shop Drawings:

1. Bar sizes, spacings, locations, splice locations, and quantities of reinforcing steel and welded wire fabric.
2. Bending and cutting schedules.
3. Supporting and spacing devices.

1.3 QUALITY ASSURANCE

- A. Perform Work according to ACI 318.
- B. Prepare Shop Drawings according to ACI SP-66.
- C. Welders: AWS qualified within previous 12 months for employed weld types.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials according to manufacturer instructions.
- B. Protection:
 1. Protect materials from moisture by storing in clean, dry location remote from construction operations areas.
 2. Provide additional protection according to manufacturer instructions.

1.5 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel:

1. Comply with ASTM A615 (A615M).
2. Yield Strength: 60 ksi
3. Billet Bars: Deformed
4. Finish: Uncoated.

B. Welded Plain Wire Fabric:

1. Comply with ASTM A1064 (A1064M).
2. Finish: Uncoated .

2.2 FABRICATION

A. Fabricate concrete reinforcement according to ACI 318.

B. Form reinforcement bends with minimum diameters according to ACI 318

2.3 ACCESSORY MATERIALS

A. Chairs, Bolsters, Bar Supports, and Spacers:

1. Size and Shape: To strengthen and support reinforcement during concrete placement conditions.

B. Special Chairs, Bolsters, Bar Supports, and Spacers Adjacent to Weather-Exposed Concrete Surfaces:

1. Material: Plastic-tipped steel.
2. Size and Shape: To meet Project conditions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place, support, and secure reinforcement against displacement.

B. Do not weld crossing reinforcement bars for assembly.

C. Spacing:

1. Space reinforcement bars with minimum clear spacing
2. If bars are indicated in multiple layers, place upper bars directly above lower bars.

- D. Maintain minimum concrete cover around reinforcement according to **ACI 318**. See drawings.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes Cast-in-Place Concrete for Following Items:
 - 1. Equipment pads.

1.2 SUBMITTALS

- A. Product Data: Submit data on joint devices, attachment accessories admixtures.
- B. Design Data:
 - 1. Submit concrete mix design for each concrete strength.
 - 2. Identify mix ingredients and proportions, including admixtures.
 - 3. Identify chloride content of admixtures and whether or not chlorides were added during manufacture.
- C. Manufacturer's Certificate: Products meet or exceed specified requirements.
- D. Manufacturer Instructions: Submit installation procedures and interfacing required with adjacent Work.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.3 SUSTAINABLE DESIGN SUBMITTALS

- A. Manufacturer's Certificate: Products meet or exceed specified sustainable design requirements.
 - 1. Indoor Air Quality Certificates:
 - a. Certify VOC content for each interior adhesive and sealant and related primer.

1.4 QUALITY ASSURANCE

- A. Perform Work according to ACI 318.
- B. Comply with ACI 305R when pouring concrete during hot weather.
- C. Comply with ACI 306.1 when pouring concrete during cold weather.
- D. Acquire cement and aggregate from one source for Work.

PART 2 - PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

- A. Indoor Environmental Quality Characteristics:
 - 1. **[Interior]** Sealants and Sealant Primers: Maximum VOC content according to SCAQMD Rule 1168.

2.2 MATERIALS

- A. Concrete:
 - 1. Cement:
 - a. Comply with ASTM C150 (C150M), Type I – Normal
 - b. Type: Portland.
 - 2. Blended Cement:
 - a. Comply with ASTM C595 (C595M).
 - b. Type: 1L.
 - c. Color: Gray.

OR

- 3. Hydraulic Cement:
 - a. Comply with ASTM C1157 (C1157M).
 - b. Type: 1L.
- 4. Normal Weight Aggregates:
 - a. Comply with ASTM C33.
 - b. Coarse Aggregate Maximum Size: 3/4” inches According to ACI 318.
- 5. Water:
 - a. Comply with ACI 318 (318M).
 - b. Potable, with maximum 8 percent of water-soluble chloride ions by weight of cement.

- B. Admixtures:
 - 1. Manufacturers:
 - a. GRACE
 - b. WR Meadows

- c. Masterbuilders
 - d. Substitutions: permitted.
2. Air Entrainment: Comply with ASTM C260 (C260M).
3. Chemical:
- a. Comply with ASTM C494 (C494M).
 - b. Type A - Water Reducing.
 - c. Type D - Water Reducing and Retarding.
 - d. Type G - Water Reducing, High Range, and Retarding.
4. Fly Ash: Comply with ASTM C618, Class F.

2.3 CONCRETE MIX

- A. Select proportions for concrete according to ACI 318 (318M) trial mixtures or field test data.
- B. Performance and Design Criteria:
- 1. Compressive Strength: 4000 psi at 28 days.
 - 2. Cement Type: ASTM C1157 (/C1157M).
 - 3. Minimum Cement Content: **570** lb./cu. yd.
 - 4. Aggregate Type: **Normal** weight.
 - 5. Maximum Water-Cement Ratio: **0.42** by weight
 - 6. Aggregate Size:
 - a. Maximum: 1/2 inch
 - 7. Air Content: 4 percent or less.
 - 8. Maximum Fly Ash Content: 20 percent of cementitious materials by weight.
 - 9. Slump: 4 inches, plus or minus 1 inch, or as approved in submittal process.
- C. Admixtures:
- 1. Include admixture types and quantities indicated in concrete mix designs only if approved by Architect/Engineer.
 - 2. Cold Weather:
 - a. Use accelerating admixtures in cold weather.
 - b. Use of admixtures will not relax cold-weather placement requirements.
 - 3. Hot Weather: Use set-retarding admixtures.
 - 4. Do not use calcium chloride or admixtures containing calcium chloride.
 - 5. Add air entrainment admixture to concrete mix for Work exposed to freezing and thawing or deicing chemicals.
- D. Average Compressive Strength Reduction: Permitted according to ACI 318
- E. Ready-Mixed Concrete: Mix and deliver concrete according to ASTM C94 (C94M)]

- F. Site-Mixed Concrete: Mix concrete according to ACI 318

2.4 ACCESSORIES

- A. Bonding Agent:

- 1. Manufacturers:

- a. SIKA
 - b. Substitutions: Permitted.

- B. Non-shrink Grout:

- 1. Manufacturers:

- a. Euclid Chemical Co.
 - b. ITW Engineered Polymers
 - c. Substitutions: Permitted.

- 2. Description: Premixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing agents.
 - 3. Comply with ASTM C1107 (C1107M).
 - 4. Minimum Compressive Strength: 1,500psi in 48 hours and 5,000 psi in 28 days.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

- A. Previously Placed Concrete:

- 1. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent.
 - 2. Remove laitance, coatings, and unsound materials.

- B. In locations where new concrete is doveled to existing work, drill holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.

- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

- D. Remove water from areas receiving concrete before concrete is placed.

3.3 INSTALLATION

A. Placing Concrete:

1. Place concrete according to ACI **318**.
2. Notify testing laboratory and Architect/Engineer minimum 24 hours prior to commencement of operations.
3. Ensure that reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.
4. Install vapor retarder under interior slabs on grade according to ASTM E1643.
5. Deposit concrete at final position, preventing segregation of mix.
6. Place concrete in continuous operation for each panel or section as determined by predetermined joints.
7. Consolidate concrete.
8. Maintain records of concrete placement, including date, location, quantity, air temperature, and test samples taken.
9. Place concrete continuously between predetermined expansion, control, and construction joints. pattern.
10. Saw-Cut Joints:
 - a. Saw-cut joints within 12 hours after placing.
 - b. Cut into **1/4** depth of slab thickness.
11. Screeding:
 - a. Screed floors level.

B. Separate Floor Toppings:

1. Prior to placing floor topping, remove deleterious material, and broom and vacuum clean.
2. Place required **reinforcement** and other items to be cast in concrete.
3. Apply bonding agent to substrate.
4. Place concrete floor toppings to required lines and levels.

C. Concrete Finishing:

1. Finish concrete floor surfaces according to ACI 318.
2. Steel trowel surfaces indicated to be exposed.
3. In areas with floor drains, maintain floor elevation at walls and pitch surfaces uniformly to drains **at** 1/8" inch per foot nominal as indicated

D. Curing and Protection:

1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
2. Maintain concrete with minimal moisture loss at relatively constant temperature for period as necessary for hydration of cement and hardening of concrete.
3. Cure concrete according to ACI 308.1.

3.4 FIELD QUALITY CONTROL

- A. Perform testing according to ACI 318.
- B. Provide unrestricted access to Work and cooperate with appointed testing firm.
- C. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- D. Strength Test Samples:
 - 1. Sampling Procedures: Comply with ASTM C172 (C172M).
 - 2. Cylinder Molding and Curing Procedures:
 - a. Comply with ASTM C31 (C31M).
 - b. Cylinder Specimens: Standard cured.
 - 3. Sample concrete and make one set of four cylinders for every class of concrete placed each day.
 - 4. Make one additional cylinder during cold weather concreting and field cure.
- E. Field Testing:
 - 1. Slump Test Method: Comply with ASTM C143 (C143M).
 - 2. Air Content Test Method: Comply with ASTM [C173 (C173M)] [C231 (C231M)].
 - 3. Temperature Test Method: Comply with ASTM C1064 (C1064M).
 - 4. Compressive Strength Concrete:
 - a. Measure slump and temperature for each sample.
 - b. Measure air content in air-entrained concrete for each sample.
- F. Cylinder Compressive Strength Testing:
 - 1. Test Method: Comply with ASTM C39 (C39M).
 - 2. Test Acceptance: According to **ACI 318**.
 - 3. Test one cylinder at 7 days.
 - 4. Test two cylinders at 28 days.
 - 5. Retain **one cylinder for testing when requested by Architect/Engineer**.
 - 6. Dispose of remaining cylinders if testing is not required.
- G. Core Compressive Strength Testing:
 - 1. Sampling and Testing Procedures: Comply with ASTM C42 (C42M).
 - 2. Test Acceptance: According to **ACI 318**
- H. Patching:
 - 1. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.
 - 2. Honeycombing or Embedded Debris in Concrete:

- a. Not acceptable.
 - b. Notify Architect/Engineer upon discovery.
 3. Patch imperfections according to ACI 318.
- I. Defective Concrete:
1. Description: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.
 2. Repair or replacement of defective concrete will be determined by Architect/Engineer.
 3. Do not patch, fill, touch up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION 033000

SECTION 040110 - MASONRY CLEANING

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 cleaning the following:
 - 1. Unit masonry surfaces.

1.3 DEFINITIONS

- A. Very Low-Pressure Spray: Under 100 psi (690 kPa).
- B. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- C. Medium-Pressure Spray: 400 to 800 psi (2750 to 5510 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to cleaning masonry including, but not limited to, the following:
 - a. Verify masonry-cleaning equipment and facilities needed to make progress and avoid delays.
 - b. Materials, material application, and sequencing.
 - c. Cleaning program.
 - d. Coordination with building occupants.

1.5 SEQUENCING AND SCHEDULING

- A. Work Sequence: Perform masonry-cleaning work in the following sequence:
 - 1. Remove plant growth.

2. Inspect for open mortar joints. Where repairs are required, delay further cleaning work until after repairs are completed, cured, and dried to prevent the intrusion of water and other cleaning materials into the wall.
3. Clean masonry surfaces.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include material descriptions and application instructions.
 2. Include test data substantiating that products comply with requirements.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For paint-remover manufacturer and chemical-cleaner manufacturer.
- B. Cleaning program.

1.8 QUALITY ASSURANCE

- A. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.
- B. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used; protection of surrounding materials; and control of runoff during operations. Include provisions for supervising worker performance and preventing damage.
 1. If materials and methods other than those indicated are proposed for any phase of cleaning work, add a written description of such materials and methods, including evidence of successful use on comparable projects and demonstrations to show their effectiveness for this Project.
- C. Mockups: Prepare mockups of cleaning on existing surfaces to demonstrate aesthetic effects and to set quality standards for materials and execution.
 1. Cleaning: Clean an area approximately 25 sq. ft. (2.3 sq. m) for each type of masonry and surface condition.
 - a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not test cleaners and methods known to have deleterious effect.
 - b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- 3.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry-cleaning work to be performed according to product manufacturers' written instructions and specified requirements.
- B. Clean masonry surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least seven days after completion of cleaning.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Water: Potable.
- B. Hot Water: Water heated to a temperature of 140 to 160 deg F (60 to 71 deg C).
- C. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.
- D. Mold, Mildew, and Algae Remover, Job Mixed: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.
- E. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.
 1. Prosoco; Enviro Klean Safety Klean.
 2. Diedrich; Echo-Scrub Acid Free Masonry Cleaner
 3. Infiniti Paints & Coatings; Masonry Cleaner & Efflorescence Remover

2.2 ACCESSORY MATERIALS

- A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, glazed masonry, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.
 1. Strippable Masking: Water-based temporary coating.

2.3 CHEMICAL CLEANING SOLUTIONS

- A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended in writing by chemical-cleaner manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Comply with each manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent paint removers and chemical cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
 - 1. Cover adjacent surfaces with materials that are proven to resist paint removers and chemical cleaners used unless products being used will not damage adjacent surfaces. Use protective materials that are waterproof and UV resistant. Apply masking agents according to manufacturer's written instructions. Do not apply liquid strippable masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
 - 2. Do not apply chemical solutions during winds of enough force to spread them to unprotected surfaces.
 - 3. Neutralize alkaline and acid wastes before disposal.
 - 4. Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.2 CLEANING MASONRY, GENERAL

- A. Cleaning Appearance Standard: Cleaned surfaces are to have a uniform appearance as viewed from 20 feet (6 m) away by Architect.
- B. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces.
- C. Use only those cleaning methods indicated for each masonry material and location.
 - 1. Brushes: Do not use wire brushes or brushes that are not resistant to the chemical cleaner being used.
 - 2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that cleaning methods do not damage surfaces, including joints.
 - a. Equip units with pressure gages.
 - b. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with nozzle having a cone-shaped spray.

- c. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.
 - d. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.
- D. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces. Keep wall wet below area being cleaned to prevent streaking from runoff.
- E. Perform additional general cleaning, paint and stain removal, and spot cleaning of small areas that are noticeably different when viewed according to the "Cleaning Appearance Standard" Paragraph, so that cleaned surfaces blend smoothly into surrounding areas.
- F. Water Application Methods:
 1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover the area being sprayed.
 2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from masonry surface and apply water in horizontal back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.
- G. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces according to chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.
- H. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running from cleaned area to determine that chemical cleaner is completely removed.
 1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.
- I. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.3 PRELIMINARY CLEANING

- A. Removing Plant Growth: Completely remove visible plants, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing remaining growth to dry if possible before removal. Remove loose soil and plant debris from open joints to whatever depth they occur.

- B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to planned cleaning methods. Extraneous substances include paint, caulking, asphalt, and tar.

- 1. Carefully remove heavy accumulations of rigid materials from masonry surface with sharp chisel. Do not scratch or chip masonry surface.

3.4 CLEANING MASONRY

- A. Cold-Water Soak:

- 1. Apply cold water by intermittent spraying to keep surface moist.
 - 2. Use perforated hoses or other means that apply a fine water mist to entire surface being cleaned.
 - 3. Apply water in cycles of five minutes on and 20 minutes off.
 - 4. Continue spraying until surface encrustation has softened enough to permit its removal by water wash, as indicated by cleaning tests
 - 5. Remove soil and soften surface encrustation from surface with cold water applied by low-pressure spray.

- B. Cold-Water Wash: Use cold water applied by low or medium-pressure spray as recommended by manufacturer.

- C. Hot-Water Wash: Use hot water applied by low or medium-pressure spray as recommended by manufacturer.

- D. Detergent Cleaning:

- 1. Wet surface with cold or hot water applied by low-pressure spray.
 - 2. Scrub surface with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.
 - 3. Rinse with cold or hot water applied by low or medium-pressure spray to remove detergent solution and soil.
 - 4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

- E. Mold, Mildew, and Algae Removal:

- 1. Wet surface with cold or hot water applied by low-pressure spray.
 - 2. Apply mold, mildew, and algae remover by brush or low-pressure spray.
 - 3. Scrub surface with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used, and that surface remains wet.
 - 4. Rinse with cold or hot water applied by low or medium-pressure spray to remove mold, mildew, and algae remover and soil.
 - 5. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

F. Nonacidic Liquid Chemical Cleaning:

1. Wet surface with cold or hot water applied by low-pressure spray.
2. Apply cleaner to surface by brush or low-pressure spray.
3. Let cleaner remain on surface for period recommended in writing by chemical-cleaner manufacturer
4. Rinse with cold or hot water applied by low or medium-pressure spray to remove chemicals and soil.

3.5 FINAL CLEANING

- A. Clean adjacent non masonry surfaces of spillage and debris. Use detergent and soft brushes or clothes.
- B. Remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- C. Remove masking materials, leaving no residues that could trap dirt.

END OF SECTION 040110

SECTION 05 12 00 — STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. All structural steel framing, including connections and accessories, as shown or implied by the Contract Documents.

1.2 QUALITY ASSURANCE

A. Qualifications of Suppliers and Personnel:

1. The steel fabricator and erector shall have successfully completed work of this type and scope. The fabrication facility shall be certified as an AISC Category I facility.
2. All welding shall be performed by operators who have been recently qualified as prescribed in "Structural Welding Code" of the American Welding Society (except for welds which do not carry calculated stress).

B. Codes and Standards:

1. In addition to complying with all pertinent codes and regulations, comply with:
2. "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction
3. "Structural Welding Code" of the American Welding Society
4. "Code of Standard Practice for Steel Buildings and Bridges" of the American Institute of Steel Construction.

C. Conflicting Requirements:

1. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or this Section of the Project Manual, the provisions of the more stringent shall govern.

1.3 SUBMITTALS

A. Shop Drawings:

1. Prior to the bulk of shop drawing preparation, submit to the Architect/Engineer shop drawings of "typical conditions" and connections to assure that the fabricators assumptions are correct as to type of connection and other pertinent details.
2. Before any structural steel is fabricated, submit shop drawings to the Architect/Engineer for review and receive approval of same in accordance with Division 01 of this Project Manual.

3. Show all shop and erection details including cuts, copes, connections, holes, threaded fasteners, and welds.
4. Show all welds, both shop and field by the currently recommended symbols of the American Welding Society.

B. Certification:

1. Submit to the Architect/Engineer a certification that the materials supplied are in accordance with the requirements of this Section of the Project Manual.

1.4 PROJECT CONDITIONS

A. Field Verification:

1. Confirm all dimensions necessary to make the framing assembly fit accurately.
2. Do not fabricate materials until field dimensions have been confirmed.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL

A. Steel Shapes and Plates:

1. All steel w-shapes shall meet the requirements of ASTM A992 or ASTM A572, Grade 50 except plates, angles and channels shall meet the requirements of ASTM A36 unless indicated otherwise on the drawings.

B. Hollow Structural Section (HSS):

1. Round, square and rectangular HSS sections shall meet the requirements of ASTM A500, Grade B.

C. Pipes:

1. Steel pipes shall meet the requirements of ASTM A501 or ASTM A53, Grade B, Type E or S.

2.2 CONNECTIONS

A. Materials:

1. High-strength bolts for shop and field connections: ASTM A325, 3/4 inch minimum diameter.
2. Anchor bolts, nuts and washers: ASTM F1554, Class 36, Grade 2A
3. Machine bolts for minor connections: ASTM A307
4. Welding electrodes: ASTM A233, Series E70XX

- B. All shop connections shall be accomplished using high strength bolts or by welding as shown on the drawings.
- C. Use high strength bolts for field connections.
- D. Bolted connections shall be bearing type connections with threads in the shear plane.
- E. All simple shear connections shall be consistent with the required end rotations per the AISC specification section J1.2.
- F. Minimum thickness of connection material shall be 5/16".

2.3 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials.
 - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 6 – For all Monumental Stair members.
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.4 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
 - 1. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
 - 2. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
 - 3. Galvanize lintels and shelf angles located in exterior walls.
 - 4. Galvanize steel members as noted on drawings.

2.5 OTHER MATERIALS

- A. All other materials not specifically described but required for a complete and proper installation of structural steel, shall be new, free from rust, first quality of their respective kinds, and subject to the acceptance of the Architect/Engineer.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 - 1. Prior to installation of the Work of this Section, carefully inspect the installed Work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
 - 2. Verify that existing conditions will permit the structural steel to be fabricated and erected in strict accordance with the original design, the shop drawings, and the referenced standards.
- B. Discrepancies:
 - 1. Do not proceed with fabrication or installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 FABRICATION

- A. General:
 - 1. Fabricate all structural steel in strict accordance with the shop drawings and the referenced standards.

B. Shop Cleaning and Priming:

1. Shop cleaning shall meet recommendations of the final finish manufacturer.
2. Shop paint all structural steel one coat where priming is required.
3. Thoroughly clean all steel that is not to be painted.

C. Milling:

1. Mill the bearing surfaces of all columns/compression members.

D. Leveling Nuts:

1. All column base plates shall be supported on leveling nuts unless noted otherwise. The area between the base plate and concrete shall be grouted in accordance with Division 03 Section "Grouting".

3.3 WELDING

A. General:

1. For details of joints, comply with requirements for AWS joints accepted with qualification tests.
2. Use ASTM A233, E-70 series electrodes.
3. Follow applicable sections of AWS specifications.

B. Types of Welds:

1. Unless otherwise noted:
 - a. Make all fillet welds 3/16" minimum.
 - b. Make all butt welds full penetration welds, using back-up or chip and back-weld.

3.4 ERECTION

A. General:

1. Erect all structural steel in strict accordance with the drawings, the shop drawings, and all pertinent regulations and standards.

B. Bolted Connections:

1. Accomplish high-strength bolted connections in accordance with the American Institute of Steel Construction's publication, "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
2. All bolts in bolted connections shall be tightened to the "snug tight condition" unless noted otherwise on the drawings.

C. Touch-Up:

1. After erection is complete:
 - a. Touch-up all shop priming coats damaged during transportation and erection.
 - b. Prime all field welds on members that have been welded, and paint all field bolts using the priming paint specified for shop priming.

D. Bracing:

1. Furnish, design, and install all temporary erection bracing.
2. Leave such bracing in place until the structure is stabilized by walls, slabs, decks and permanent bracing. All connections shall be fully installed and fill concrete elements shall be at their respective full specified 28-day compressive strengths prior to removal of temporary bracing.

3.5 INSPECTION AND QUALITY ASSURANCE

A. Field Quality Control by Testing Laboratory: Perform the following quality control tests and inspections. Interpret test results, submit daily reports and monthly summary reports.

1. Examine the Manufacturer's test certificates for all materials provided. Verify that the lot numbers of the tested material coincides with the lot numbers of the material used on-site.
2. High strength bolted connections:
 - a. Routinely monitor field bolting procedures during bolt installation. Verify that all bolts in all connections are brought to a "snug tight" condition with all plies of the connection in firm contact. Verify that bolts in connections identified as either slip-critical or direct tension connections are being additionally tightened by the proper technique(s) determined in the tension testing device described above.
 - b. Check that all bolted connections are being installed in accordance with the procedures outlined in the RCSC "Specification."
3. Welded connections:
 - a. Obtain qualifications of all welders and verify all welding procedures, including the Contractor's compliance with preheat, weather-protection, electrodes, and welding surface preparation requirements.
 - b. Visually inspect all field welding operations and welds.

END OF SECTION 05 12 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Steel framing and supports for mechanical and electrical equipment.
- 2. Steel framing and supports for applications where framing and supports are not specified

- B. Products furnished, but not installed, under this Section include the following:

- 1. Loose steel lintels.
- 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

- C. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
- 2. Section 051200 "Structural Steel Framing."

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

- 1. Grout.

- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

- 1. Steel framing and supports for mechanical and electrical equipment.
- 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.

3. Elevator machine beams, hoist beams, and divider beams.
4. Steel shapes for supporting elevator door sills.
5. Shelf angles.
6. Metal ladders.
7. Metal floor plate.
8. Elevator pit sump covers.
9. Loose steel lintels.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

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. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- E. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- F. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- G. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- H. Zinc-Coated Steel Wire Rope: ASTM A 741.
 - 1. Wire-Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

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 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
 - 3. Provide stainless-steel fasteners for fastening nickel silver.
 - 4. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1), Group 2 (A4).
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

- F. Anchors, General: 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.
- G. 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.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.3 MISCELLANEOUS MATERIALS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Shop Primers: Provide primers that comply with Section 099100 "Painting" and Section 099600 "High-Performance Coatings".
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- G. 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.
- H. 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 4000 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 (1 mm) 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.

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. Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.
 - 1. Provide bearing plates welded to beams where indicated.
 - 2. Drill or punch girders and plates for field-bolted connections where indicated.
 - 3. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches (600 mm) o.c.
- E. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
 - 1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
 - 2. Unless otherwise indicated, provide 1/2-inch (12.7-mm) baseplates with four 5/8-inch (16-mm) anchor bolts and 1/4-inch (6.4-mm) top plates.
- F. Galvanize miscellaneous framing and supports where indicated.
- G. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.6 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.

2.7 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize and prime loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.8 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.

2.9 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 not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- D. 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.
- B. Anchor supports securely to, and rigidly brace from, building structure.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 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 (0.05-mm) dry film thickness.

END OF SECTION 05 50 00

SECTION 061000 - ROUGH CARPENTRY

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking and nailers.
3. Wood furring.
4. Plywood backing panels.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) size or greater but less than 5 inches nominal (114 mm actual) size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Reports: For the following, from ICC-ES:

1. Fire-retardant-treated wood.
2. Power-driven fasteners.

- C. Qualification Statements: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber:
 - 1. Boards: 19 percent.
 - 2. Dimension Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less; 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 FIRE-RETARDANT TREATMENT

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
 - 3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. Application: Treat all rough carpentry unless otherwise indicated.

1. Concealed blocking.
2. Plywood backing panels.

2.3 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions by Grade: Standard, Stud, or No. 3 grade.

1. Application: All interior partitions.
2. Species:
 - a. Hem-fir (north); NLGA.
 - b. Southern pine or mixed southern pine; SPIB.
 - c. Spruce-pine-fir; NLGA.
 - d. Hem-fir; WCLIB, or WWPA.
 - e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 MISCELLANEOUS LUMBER

A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.

B. Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine or southern pine; No. 3 grade; SPIB.
2. Hem-fir or hem-fir (north); Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.6 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.7 METAL FRAMING ANCHORS

- A. Allowable design loads, as published by manufacturer, shall meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
 - 1. Cleveland Steel Specialty
 - 2. KC Metal Products
 - 3. Phoenix Metal Products
 - 4. Simpson Strong-Tie
 - 5. USP Structural Connectors, Inc.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel

Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate [furring,]nailers, blocking, [grounds,]and similar supports to comply with requirements for attaching other construction.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Install shear wall panels to comply with manufacturer's written instructions.
- F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
- J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

- K. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. ICC-ES evaluation report for fastener.
- L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- M. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with approved fastener patterns where applicable.
 - 2. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 INSTALLATION OF WOOD FURRING

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring horizontally and vertically at 24 inches (610 mm) o.c.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) [400 mm] o.c.

END OF SECTION 061000

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 COORDINATION

- #### A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
4. Apply AWI Quality Certification Program label to Shop Drawings.

- #### C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.

D. Samples for Verification: For the following:

1. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Certificates: For each type of product.

1.5 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Licensed participant in AWI's Quality Certification Program.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Formica Corporation products or comparable product by one of the following:
 - a. Nevamar Company, LLC.
 - b. Wilsonart LLC

2.2 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI certification program indicating that woodwork and installation complies with requirements of grades specified.
 - a. This project has been registered with AWI as AWI Quality Certification Program Number.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
 - 1. Inspection entity shall prepare and submit report of inspection.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

SECTION 070150.19 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of This Section Includes:
 - 1. Partial roof tear-off.
 - 2. Base flashing removal.
 - 3. Disposal.

1.2 DEFINITIONS

- A. EPS: Molded (expanded) polystyrene.
- B. OSB: Oriented strand board.
- C. Partial Roof Tear-off: Removal of selected components and accessories from existing roofing system.
- D. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.
 - 1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:
 - a. Reroofing preparation, including roofing system manufacturer's written instructions.
 - b. Temporary protection requirements for existing roofing system components that are to remain.
 - c. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.
 - d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
 - e. Existing roof deck conditions requiring Architect notification.
 - f. Existing roof deck removal procedures and Owner notifications.

- g. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
- h. Structural loading limitations of roof deck during reroofing.
- i. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
- j. HVAC shutdown and sealing of air intakes.
- k. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
- l. Asbestos removal and discovery of asbestos-containing materials.
- m. Governing regulations and requirements for insurance and certificates if applicable.
- n. Existing conditions that may require Architect notification before proceeding.

1.4 ACTION SUBMITTALS

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

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
 - 1. Include certificate that Installer is approved by warrantor of existing roofing system.
 - 2. Include certificate that Installer is licensed to perform asbestos abatement.
- B. Photographs or Video: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.
 - 1. Submit before Work begins.

1.6 CLOSEOUT SUBMITTALS

- A. Certified statement from Carlisle Golden Seal Total Roofing System stating that existing roof warranty has not been affected by Work performed under this Section.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing and licensed to perform asbestos abatement in the state or jurisdiction where Project is located.
- B. Regulatory Requirements:

1. Comply with governing EPA notification regulations before beginning roofing removal.
2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.8 FIELD CONDITIONS

- A. Existing Roofing System: SBS-modified bituminous and TPO roofing.
- B. Owner will occupy portions of building immediately below reroofing area.
 1. Conduct reroofing so Owner's operations are not disrupted.
 2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
 3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
 1. Remove only as much roofing in one day as can be made watertight in the same day.
- G. Hazardous Materials:
 1. It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.
 - a. Hazardous materials will be removed by Owner before start of the Work.
 - b. Existing roof will be left no less watertight than before removal.
 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
 - a. Hazardous materials will be removed by Owner under a separate contract.

1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing roofing system warranty issued by Carlisle Gold Seal Total Roofing System Warranty.
 - 1. Notify warrantor before proceeding with the Work.
 - 2. Notify warrantor of existing roofing system on completion of reroofing, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect.
 - a. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

- A. EPS Insulation: ASTM C578.
- B. Plywood: DOC PS 1, Grade CD, Exposure 1.
- C. OSB: DOC PS 2, Exposure 1.

2.2 TEMPORARY ROOFING MATERIALS

- A. Design and selection of materials for temporary roofing are Contractor's responsibilities.

2.3 AUXILIARY REROOFING MATERIALS

- A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Protect existing roofing system that is not to be reroofed.
 - 2. Limit traffic and material storage to areas of existing roofing that have been protected.

3. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.
 4. Comply with requirements of existing roof system manufacturer's warranty requirements.
- B. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.
- C. Shut off rooftop utilities and service piping before beginning the Work.
- D. Test existing roof drains to verify that they are not blocked or restricted.
1. Immediately notify Architect of any blockages or restrictions.
- E. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.
1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- F. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- G. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.
1. Prevent debris from entering or blocking roof drains and conductors.
 - a. Use roof-drain plugs specifically designed for this purpose.
 - b. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
 2. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding.
 - a. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF

- A. Notify Owner each day of extent of roof tear-off proposed for that day and obtain authorization to proceed.
- B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- C. Partial Roof Tear-off: Remove existing roofing down to existing cover board or existing insulation and immediately check for presence of moisture.

1. Engage a qualified testing agency to perform the following test:
2. Survey exposed substrate that is to remain using infrared color thermography according to ASTM C1153.
 - a. Prepare survey report of initial scan indicating locations of entrapped moisture, if any, and area calculations of locations of entrapped moisture.
3. Survey exposed substrate that is to remain using electrical capacitance/impedance testing according to ASTM D7954/D7954M.
 - a. Prepare survey report indicating locations of entrapped moisture, if any, and area calculations of locations of entrapped moisture.
4. Survey exposed substrate that is to remain using nuclear hydrogen detection testing according to SPRI/RCI NT-1.
 - a. Prepare survey report indicating locations of entrapped moisture, if any, and area calculations of locations of entrapped moisture.
5. Remove wet or damp materials below existing roofing and above deck as directed by Architect.
6. Inspect wood blocking, curbs, and nailers for deterioration and damage.
 - a. If wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
7. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry.
 - a. Remove unadhered bitumen, unadhered felts, and wet felts.
8. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.3 INFILL MATERIALS INSTALLATION

- A. Immediately after roof tear-off, and inspection and repair, if needed, of deck, fill in tear-off areas to match existing roofing system construction.
 1. Installation of infill materials is specified in Section 075216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing." or Section 075423 "Thermoplastic-Polyolefin (TPO) Roofing."
 2. Installation of wood blocking, curbs, and nailers is specified in Section 061000 "Rough Carpentry."
- B. Install new roofing patch over roof infill area.

1. If new roofing is installed the same day tear-off is made, roofing patch is not required.

3.4 BASE FLASHING REMOVAL

A. Remove existing base flashings.

1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain.

1. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish as existing.

C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage.

1. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.

3.5 DISPOSAL

A. Collect demolished materials and place in containers.

1. Promptly dispose of demolished materials.
2. Do not allow demolished materials to accumulate on-site.
3. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 070150.19

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass-fiber blanket insulation.
- B. Related Requirements:
 - 1. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than 25 and 450 when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Labeling: Provide identification of mark indicating R-value of each piece of insulation **12 inches (305 mm)** and wider in width.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E136 for combustion characteristics.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Certainteed; SAINT-GOBAIN.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.

2.3 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGM Industries, Inc.
 - b. Gemco.
 - 2. Plate: Perforated, galvanized carbon-steel sheet, **0.030 inch (0.762 mm)** thick by **2 inches (50 mm)** square.
 - 3. Spindle: Copper-coated, low-carbon steel; fully annealed; **0.105 inch (2.67 mm)** in diameter; length to suit depth of insulation.

- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AGM Industries, Inc.
 - b. Gemco.
- C. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch (25 mm) between face of insulation and substrate to which anchor is attached.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.4 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
- B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain **3-inch (76-mm)** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed **96 inches (2438 mm)**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
 - 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately **2.5 lb/cu. ft. (40 kg/cu. m)**.

3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION 072100

SECTION 075216 - STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roof system.
2. Base sheet materials.
3. Interply sheets.
4. Styrene-butadiene-styrene (SBS)-modified bituminous cap sheet.
5. Base flashing sheet materials.
6. Asphalt materials.
7. Accessory roofing materials.
8. Substrate board.
9. Vapor retarder.
10. Roof insulation.
11. Insulation accessories and cover board.
12. Walkways.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roof system.
2. Base sheet materials.
3. Interply sheets.
4. Styrene-butadiene-styrene (SBS)-modified bituminous cap sheet.
5. Base flashing sheet materials.
6. Asphalt materials.
7. Accessory roofing materials.
8. Substrate board.
9. Vapor retarder.
10. Roof insulation.
11. Insulation accessories and cover board.
12. Walkways.

B. Product Data Submittals:

1. For insulation and roof system component fasteners, include copy of SPRI's Directory of Roof Assemblies listing.
- C. Shop Drawings: Include plans, sections, details, and attachments to other work, including the following:
1. Layout and thickness of insulation.
 2. Base flashings and membrane terminations.
 3. Flashing details at penetrations.
 4. Tapered insulation, including slopes.
 5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
 6. Crickets, saddles, and tapered edge strips, including slopes.
 7. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 8. Tie-in with adjoining air barrier.
- D. Samples for Verification: For the following products:
1. Cap Sheet: Samples of manufacturer's standard colors for selection by Architect.
 2. Flashing Sheet: Samples of manufacturer's standard colors for selection by Architect.
 3. Walkway Pads or Rolls: Samples of manufacturer's standard colors for selection by Architect.
- E. Wind Uplift Resistance Submittal: For roofing system indicating compliance with wind uplift performance requirements.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer, manufacturer and testing agency.
- B. Manufacturer Certificates:
1. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Product Test Reports: For roof membrane and insulation, tests performed by a qualified testing agency, indicating compliance with specified requirements.
- D. Evaluation Reports: For components of membrane roofing system, from ICC-ES.
- E. Sample Warranties: For manufacturer's special warranties.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For roofing system to include in maintenance manuals.

- B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed, listed in SPRI's Directory of Roof Assemblies for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
 - 1. Protect stored liquid material from direct sunlight.
 - 2. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources.
 - 1. Store in a dry location.
 - 2. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, vapor retarder, substrate board, and other components of roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and flashings to withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings to remain watertight.
 1. Accelerated Weathering: Roof membrane to withstand 2000 hours of exposure when tested in accordance with ASTM G152, ASTM G154, or ASTM G155.
 2. Impact Resistance: Roof membrane to resist impact damage when tested in accordance with ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials to be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested in accordance with FM Approvals 4474, UL 580, or UL 1897:
 1. Zone 1 (Roof Area Field): 61 lbf/sq. ft. (2.9 kPa).
 2. Zone 2 (Roof Area Perimeter): 80 lbf/sq. ft. (3.8 kPa).
 - a. Location: From roof edge to 3 feet inside roof edge.
 3. Zone 3 (Roof Area Corners): 109 lbf/sq. ft. (5.2kPa).
 - a. Location: 3 feet in each direction from each building corner.
- D. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system and are listed in SPRI's Directory of Roof Assemblies for roof assembly identical to that specified for this Project.
 1. Wind Uplift Load Capacity: 105 psf.
- E. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency.
 1. Identify products with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated.

1. Identify products with appropriate markings of applicable testing agency.

2.2 STYRENE-BUTADIENE-STYRENE (SBS)-MODIFIED BITUMINOUS MEMBRANE ROOFING

A. Styrene-Butadiene-Styrene (SBS)-Modified Bituminous Membrane Roof System: See the following articles for individual roof materials required.

1. Basis of Design: Soprema or approved equal.

2.3 SOURCE LIMITATIONS

A. Obtain components for roof system from roof membrane manufacturer.

2.4 BASE SHEET MATERIALS

A. SBS-Modified Bitumen Type I, Polyester-Mat Base Sheet, Torch: ASTM D6164/D6164M, Type I, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric, smooth surfaced, suitable for torch application method.

1. Base Ply/Flashing Base Ply, Heat Welded: Soprema Sopralene Flam 180: SBS-Modified Bitumen Membrane with plastic burn-off fil on top and bottom surfaces. Thickness: 118 mils (3.0 mm).

2.5 STYRENE-BUTADIENE-STYRENE (SBS)-MODIFIED BITUMINOUS CAP SHEET

A. SBS-Modified Bitumen Type I, Polyester-Mat, Granule-Surfaced Cap Sheet, Torch: ASTM D6164/D6164M, Type I, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric, suitable for torch application method.

1. Cap Sheet/Flashing Cap Sheet, Heat Welded: Soprema Sopralene Flam 180 FR GR: SBS-Modified Bitumen Membrane Cap Sheet with a burn-off film bottom surface and mineral granule top surface. Thickness: 157 mils (4.0 mm).

2. Granule Color: Match existing.

2.6 BASE FLASHING SHEET MATERIALS

A. SBS-Modified Bitumen Backer Sheet: ASTM D6164/D6164M, Type I or II, Grade S, reinforced with polyester fabric, smooth surfaced, suitable for application method specified.

B. SBS-Modified Bitumen, Granule-Surfaced Flashing Sheet: ASTM D6164/D6164M, Type I or II, Grade G, reinforced with polyester fabric, granule surfaced, suitable for application method specified, and as follows:

1. Granule Color: Match existing.

2.7 ACCESSORY ROOFING MATERIALS

- A. General: Accessory materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
- B. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- C. Roof Vents: As recommended by roof membrane manufacturer.
 1. Size: Not less than 4-inch (100-mm) diameter.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- G. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.8 SUBSTRATE BOARD

- A. Glass-Mat Gypsum Roof Substrate Board: ASTM C1177/C1177M, water-resistant gypsum board.
 1. Thickness: Type X, 5/8 inch (16 mm).
 2. Surface Finish: Factory primed.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.9 VAPOR RETARDER

- A. Polyethylene Film: ASTM D4397, 10 mils (0.25 mm) thick, minimum, with maximum permeance rating of 0.76 perm (0.050 metric perm).
 1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
 2. Adhesive: Manufacturer's standard lap adhesive, FM Approvals approved for vapor-retarder application.

- B. Laminated Sheet Vapor Retarder: Two layers, fire-retardant polyethylene laminate, reinforced with cord grid.
 - 1. Basis of Design: Reef Industries, Griffolyn Type-55 FR or approved equal.
 - 2. Permeance Rating: Not more than 0.062 perm (3.556 ng/Pa x s x sq. m) when tested in accordance with ASTM E96/E96M.
 - 3. Flame Spread Index: Not more than 5 when tested in accordance with ASTM E84.
 - 4. Smoke-Developed Index: Not more than 35 when tested in accordance with ASTM E84.
 - 5. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.10 ROOF INSULATION

- A. General: Preformed roof insulation boards, manufactured or approved by roof membrane manufacturer, approved for use in SPRI's Directory of Roof Assemblies listed roof assemblies.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Basis of Design: Soprema Sopra-ISO: Closed Cell Polyisocyanurate Foam Core Bonded on each side to a glass fiber-reinforced felt facer.
 - 2. Compressive Strength: 20 psi (138 kPa).
 - 3. Size: 48 by 96 inches (1219 by 2438 mm).
 - 4. Thickness:
 - a. Base Layer: 1-1/2 inches (38 mm).
 - b. Upper Layer: 4 inches (102 mm).
- C. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Basis of Design: Soprema Sopra-ISO Tapered: Closed Cell Polyisocyanurate Foam Core bonded on each side to a glass fiber-reinforced felt facer.
 - 2. Minimum Thickness: 1/4 inch (6 mm).
 - 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.11 INSULATION ACCESSORIES AND COVER BOARD

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
 - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
 - 3. Full-spread spray-applied, low-rise, two-component urethane adhesive.
- D. Insulation Cant Strips: ASTM C728, perlite insulation board.
- E. Wood Nailer Strips: Comply with requirements in Section 061000 "Rough Carpentry."
- F. Tapered Edge Strips: ASTM C728, perlite insulation board.
- G. Polyisocyanurate Insulation Cover Board: ASTM C1289, Type II, Class 4, Grade 1, 1/2 inch (13 mm) thick, having a minimum compressive strength of 80 psi (551 kPa).

2.12 WALKWAYS

- A. Walkway Cap-Sheet Strips: ASTM D6164/D6164M, Type I or II, Grade G, SBS-modified asphalt sheet (reinforced with polyester fabric); granule surfaced; suitable for application method specified, and as follows:
 - 1. Size: 36 by 60 inches (914 mm by 1524 mm).
 - 2. Granule Color: Match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as

recommended by roofing system manufacturer, when tested in accordance with ASTM F2170.

- a. Test Frequency: One test probe per each 1000 sq. ft. (93 sq. m), or portion thereof, of roof deck, with not less than three test probes.
 - b. Submit test reports within 24 hours of performing tests.
6. Verify that concrete-curing compounds that impair adhesion of roofing components to roof deck have been removed.
 7. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.
 8. Verify that minimum curing period recommended by roofing system manufacturer for lightweight insulating concrete roof decks has passed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.
 1. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.
 1. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests in accordance with roof system manufacturer's recommendations.
 1. Submit test result within 24 hours of performing tests.
 - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system in accordance with roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast.
 1. Remove and discard temporary seals before beginning work on adjoining roofing.

- C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 INSTALLATION OF SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (600 mm) in adjacent rows.
 - 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 - 2. Tightly butt substrate boards together.
 - 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

3.5 INSTALLATION OF VAPOR RETARDER

- A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches (51 and 150 mm), respectively.
 - 1. Extend vertically up parapet walls and projections to a minimum height equal to height of the insulation and cover board.
 - 2. Continuously seal side and end laps with tape or adhesive.
- B. Laminate Sheet: Loosely lay laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches (51 and 150 mm), respectively.
 - 1. Extend vertically up parapet walls and projections to a minimum height equal to height of the insulation and cover board.
 - 2. Continuously seal side and end laps with tape.
- C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Nailer Strips: Mechanically fasten 4-inch nominal- (89-mm actual-) width, wood nailer strips of same thickness as insulation perpendicular to sloped roof deck at the following spacing:

1. 16 feet (4.88 m) apart for roof slopes greater than 1 inch per 12 inches (1:12) but less than 3 inches per 12 inches (3:12).
- D. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.
- E. Installation Over Metal Decking:
1. Install base layer of insulation with end joints staggered not less than 12 inches (300 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - e. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - 1) Trim insulation, so that water flow is unrestricted.
 - f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - h. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) accordance with requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
 2. Install upper layers of insulation and tapered insulation, with joints of each layer offset not less than 12 inches (300 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (300 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - e. Trim insulation, so that water flow is unrestricted.
 - f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

- g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- h. Adhere each layer of insulation to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

F. Installation Over Concrete Decks:

- 1. Install base layer of insulation with end joints staggered not less than 12 inches (300 mm) in adjacent rows].
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - c. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - 1) Trim insulation, so that water flow is unrestricted.
 - d. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - e. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - f. Adhere base layer of insulation to concrete roof deck or to vapor retarder in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- 2. Install upper layers of insulation and tapered insulation, with joints of each layer offset not less than 12 inches (300 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (300 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).

- 1) Trim insulation, so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- G. Installation Over Lightweight Insulating Concrete Decks:
1. Mechanically fasten vented base sheet to lightweight insulating concrete roof deck, with vented side down, using mechanical fasteners specifically designed and sized for fastening to lightweight insulating concrete decks.
 - a. Fasten vented base sheet in accordance with requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - b. Fasten vented base sheet to resist uplift pressure at corners, perimeter, and field of roof.
 2. Install base layer of insulation with end joints staggered not less than 12 inches (300 mm) in adjacent rows.
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - 1) Trim insulation, so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere base layer of insulation to vented base sheet in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

- 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
3. Install upper layers of insulation and tapered insulation, with joints of each layer offset not less than 12 inches (300 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (300 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - 1) Trim insulation, so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines, with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board, so that water flow is unrestricted.
 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 4. Adhere cover board to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 INSTALLATION OF ROOFING MEMBRANE, GENERAL

- A. Install roofing system in accordance with roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
- B. Where roof slope exceeds 1/2 inch per 12 inches (1:24), install roofing membrane sheets parallel with slope.
- C. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
 - 2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.9 INSTALLATION OF BASE SHEET

- A. Before installing, unroll base sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature.
- B. Installation of Base Sheet:
 - 1. Install SBS-modified bitumen polyester-mat base sheet in accordance with roofing manufacturer's written instructions, starting at low point of roofing system.
 - 2. Extend roofing sheets over and terminate above cants.
 - 3. Install base sheet in a shingle fashion.
 - 4. Torch-apply to substrate.
 - a. Perform torch application in accordance with NFPA 241, including two-hour fire watch after torches have been extinguished.
 - 5. Install base sheet without wrinkles, rears, and free from air pockets.
 - 6. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.
 - a. Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches (76 mm).
 - b. Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches (300 mm).
 - c. Stagger end laps not less than 18 inches (450 mm).
 - d. Heat-weld end laps leaving no voids.
 - e. Roll laps with a 20-pound (9-kg) roller.
 - 7. Repair tears and voids in laps and lapped seams not completely sealed.

8. Apply pressure to the body of the base sheet in accordance with manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

3.10 INSTALLATION OF SBS-MODIFIED BITUMINOUS CAP SHEET

- A. Before installing, unroll cap sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature at which cap sheet will be installed.
- B. Install modified bituminous roofing cap sheet in accordance with roofing manufacturer's written instructions, starting at low point of roofing system.
 1. Extend cap sheet over and terminate above cants.
 2. Install cap sheet in a shingle fashion.
 3. Install cap sheet as follows:
 - a. Torch-apply to substrate.
 - 1) Perform torch application in accordance with NFPA 241, including two-hour fire watch after torches have been extinguished.
 4. Install cap sheet without wrinkles or tears, and free from air pockets.
 5. Install cap sheet so side and end laps shed water.
- C. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.
 1. Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches (76 mm).
 2. Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches (300 mm).
 3. Stagger end laps not less than 18 inches (450 mm).
 4. Heat-weld laps, leaving no voids.
 5. Roll laps with a 20-pound (9-kg) roller.
 6. Repair tears and voids in laps and lapped seams not completely sealed.
- D. Apply pressure to the body of the cap sheet in accordance with manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

3.11 INSTALLATION OF FLASHING AND STRIPPING

- A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates in accordance with roofing system manufacturer's written instructions and as follows:
 1. Backer Sheet Application: Mechanically fasten backer sheet to walls or parapets.
 - a. Seal all laps.

2. Flashing Sheet Application, Hot: Torch-apply flashing sheet to substrate.
 - a. Perform torch application in accordance with NFPA 241, including two-hour fire watch after torches have been extinguished.
 3. Flashing Sheet Application, Cold: Adhere flashing sheet to substrate in cold-applied adhesive at rate required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
- D. Install liquid flashing system in accordance with manufacturer's recommendations.
1. Extend liquid flashing not less than 3 inches (76 mm) in all directions from edges of item being flashed.
 2. Embed granules, matching color of roof membrane, into wet compound.
- E. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing in accordance with roofing system manufacturer's written instructions.
- F. Roof Drains: Set 30-by-30-inch- (760-by-760-mm-) 4-pound (1.8 kg) lead flashing in bed of asphaltic adhesive on completed roofing membrane.
1. Cover lead flashing with roofing cap-sheet stripping, and extend a minimum of 6 inches (150 mm) beyond edge of metal flashing onto field of roofing membrane.
 2. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
 3. Install stripping in accordance with roofing system manufacturer's written instructions.

3.12 INSTALLATION OF WALKWAYS

- A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, in accordance with walkway pad manufacturer's written instructions.
1. Install walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Top and bottom of each roof access ladder.
 - e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - f. As required by roof membrane manufacturer's warranty requirements.

2. Provide 3-inch (76-mm) clearance between adjoining pads.
3. Heat-weld to substrate or adhere walkway products to substrate with compatible adhesive in accordance with roofing system manufacturer's written instructions.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Perform the following tests:
 1. Infrared Thermography: Testing agency surveys entire roof area using infrared color thermography in accordance with ASTM C1153.
 - a. Perform tests before overlying construction is placed.
 - b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing, or by nuclear hydrogen detection testing.
 - c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - d. Testing agency to prepare survey report of initial scan indicating locations of entrapped moisture if any.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Roofing system will be considered defective if it does not pass tests and inspections.
 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.14 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
 1. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and in accordance with warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.15 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

- 1. Owner: <Insert name of Owner>.
- 2. Owner Address: <Insert address>.
- 3. Building Name/Type: <Insert information>.
- 4. Building Address: <Insert address>.
- 5. Area of Work: <Insert information>.
- 6. Acceptance Date: _____.
- 7. Warranty Period: <Insert time>.
- 8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

- 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 115 mph (m/s);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075216

SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

1.1 SUMMARY

A. Section Includes:

1. Ethylene-propylene-diene-terpolymer (EPDM) roofing.
2. Accessory roofing materials.
3. Substrate board.
4. Vapor retarder.
5. Roof insulation.
6. Insulation accessories and cover board.
7. Asphalt materials.
8. Walkways.

1.2 DEFINITIONS

- #### A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Ethylene-propylene-diene-terpolymer (EPDM) roofing.
2. Accessory roofing materials.
3. Substrate board.
4. Vapor retarder.
5. Roof insulation.
6. Insulation accessories and cover board.
7. Asphalt materials.
8. Walkways.

B. Product Data Submittals:

1. For insulation and roof system component fasteners, include copy of SPRI's Directory of Roof Assemblies listing.

C. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane terminations.
3. Flashing details at penetrations.
4. Tapered insulation, thickness, and slopes.

5. Roof plan showing orientation of steel roof deck and orientation of roof membrane and fastening spacings and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
7. Tie-in with air barrier.

D. Samples for Verification: For the following products:

1. Roof membrane and flashings of color required.
2. Aggregate surfacing material in gradation and color required.
3. Walkway pads or rolls, of color required.

E. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of complying with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Evaluation Reports: For components of roofing system, from ICC-ES.

E. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed, listed in SPRI's Directory of Roof Assemblies for roofing system identical to that used for this Project.

- B. **Installer Qualifications:** A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. **Weather Limitations:** Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. **Special Warranty:** Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system.
 - 2. **Warranty Period:** 20 years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and base flashings to withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings to remain watertight.
 - 1. Accelerated Weathering: Roof membrane to withstand 2000 hours of exposure when tested in accordance with ASTM G152, ASTM G154, or ASTM G155.
 - 2. Impact Resistance: Roof membrane to resist impact damage when tested in accordance with ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials to be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested in accordance with FM Approvals 4474, UL 580, or UL 1897:
 - 1. Zone 1 (Roof Area Field): 61 lbf/sq. ft. (kPa).
 - 2. Zone 2 (Roof Area Perimeter): 88 lbf/sq. ft. (kPa).
 - a. Location: From roof edge to not less than 3 feet inside roof edge.
 - 3. Zone 3 (Roof Area Corners): 109 lbf/sq. ft. (kPa).
 - a. Location: Not less than 3 feet in each direction from building corner.
- D. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and are listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
 - 1. Wind Uplift Load Capacity: 105 psf
- E. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

- A. EPDM Sheet: ASTM D4637/D4637M, Type I, nonreinforced, self-adhering EPDM sheet with factory-applied seam tape].

1. Basis of Design: Carlisle Syntec Systems, Sure Seal EPDM roofing system or approved equal.
2. Thickness: 90 mils (2.2 mm), nominal.
3. Exposed Face Color: White on black, field verify, match existing.
4. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.

2.3 ACCESSORY ROOFING MATERIALS

- A. General: Accessory materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.
- C. Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55 to 60 mils (1.4 to 1.5 mm) thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.
- D. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- E. Roof Vents: As recommended by roof membrane manufacturer.
 1. Size: Not less than 4-inch (100-mm) diameter.
- F. Bonding Adhesive: Manufacturer's standard.
- G. Seaming Material: Factory-applied seam tape, width as recommended by manufacturer.
- H. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- I. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- J. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- K. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), prepunched.
- L. Ballast Retaining Bar: Perimeter securement system consisting of a slotted extruded-aluminum retention bar with an integrated compression fastening strip.
 1. Fasteners: 1-1/2-inch (38-mm) stainless steel fasteners with neoprene washers.

- M. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.
- N. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
 - 1. Provide white flashing accessories for white EPDM membrane roofing.

2.4 SUBSTRATE BOARD

- A. Glass-Mat Gypsum Roof Substrate Board: ASTM C1177/C1177M, water-resistant gypsum board.
 - 1. Thickness: Type X, 5/8 inch (16 mm).
 - 2. Surface Finish: [Factory primed.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

2.5 VAPOR RETARDER

- A. Polyethylene Film: ASTM D4397, 10 mils (0.25 mm) thick, minimum, with maximum permeance rating of 0.076 perm (0.050 metric perm).
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, listed by FM Approvals for vapor retarder application.
- B. Laminated Sheet Vapor Retarder: Two-layer, fire-retardant polyethylene laminate, reinforced with cord grid.
 - 1. Permeance Rating: Not more than 0.062 perm (3.556 ng/Pa x s x sq. m) when tested in accordance with ASTM E96/E96M.
 - 2. Flame-Spread Index: Not more than 5 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 35 when tested in accordance with ASTM E84.
 - 4. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM roof membrane manufacturer, approved for use in SPRI's Directory of Roof Assemblies listed roof assemblies.

- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1 felt face or Type II, Class 2 coated glass-fiber facer on both major surfaces.
 - 1. Compressive Strength: 20 psi (138 kPa).
 - 2. Size: 48 by 96 inches (1219 by 2438 mm).
 - 3. Thickness:
 - a. Base Layer: 1-1/2 inches (38 mm).
 - b. Upper Layer: 4 inches (102 mm).
- C. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Match roof insulation.
 - 2. Minimum Thickness: 1/4 inch (6.35 mm).
 - 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.7 INSULATION ACCESSORIES AND COVER BOARD

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
 - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
 - 3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
- D. Polyisocyanurate Insulation Cover Board: ASTM C1289 Type II, Class 4, Grade 1, 1/2 inch (13 mm) thick, with a minimum compressive strength of 80 psi (551 kPa).

2.8 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.
 - 1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
 - 2. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer when tested in accordance with ASTM F2170.
 - a. Test Frequency: One test probe per each 1000 sq. ft. (93 sq. m), or portion thereof, of roof deck, with not less than three test probes.
 - b. Submit test reports within 24 hours of performing tests.
 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 7. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.
 8. Verify that minimum curing period recommended by roof system manufacturer for lightweight insulating concrete roof decks has passed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation in accordance with roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests in accordance with roof system manufacturer's written instructions.
1. Submit test result within 24 hours of performing tests.

- a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system in accordance with roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 INSTALLATION OF SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 2. Tightly butt substrate boards together.
 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

3.5 INSTALLATION OF VAPOR RETARDER

- A. Polyethylene Film: Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches (50 and 150 mm), respectively.
 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 2. Continuously seal side and end laps with [tape] [adhesive].
- B. Laminate Sheet: Loosely lay laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches (50 and 150 mm), respectively.
 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 2. Continuously seal side and end laps with tape.

- C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - h. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation in accordance with requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

- c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
- d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
- e. Trim insulation so that water flow is unrestricted.
- f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
- g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- h. Adhere each layer of insulation to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

D. Installation Over Concrete Decks:

- 1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere base layer of insulation to concrete roof deck or to vapor retarder in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity] and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

E. Installation Over Lightweight Insulating Concrete Roof Decks:

1. Mechanically fasten vented base sheet to lightweight insulating concrete, with vented side down, using mechanical fasteners specifically designed and sized for fastening to lightweight insulating concrete roof decks.
 - a. Fasten vented base sheet in accordance with requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - b. Fasten vented base sheet to resist uplift pressure at corners, perimeter, and field of roof.
2. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.

- d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere base layer of insulation to vented base sheet in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
3. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
- a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
3. Cut and fit cover board tight to nailers, projections, and penetrations.
4. Adhere cover board to substrate using adhesive in accordance with SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 INSTALLATION OF SELF-ADHERING ROOF MEMBRANE

- A. Adhere roof membrane over area to receive roofing in accordance with roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Fold roof membrane to expose half of sheet width's bottom surface.
 1. Remove release liner on exposed half of sheet.
 2. Roll roof membrane over substrate while avoiding wrinkles.
- F. Fold remaining half of roof membrane to expose bottom surface.
 1. Remove release liner on exposed half of sheet.
 2. Roll roof membrane over substrate while avoiding wrinkles.
- G. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- H. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- I. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
 2. Apply lap sealant and seal exposed edges of roofing terminations.

- J. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- K. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.
- L. Adhere protection sheet over roof membrane at locations indicated.

3.9 INSTALLATION OF BASE FLASHING

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates in accordance with roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.10 INSTALLATION OF WALKWAYS

- A. Flexible Walkways: Install walkway products in accordance with manufacturer's written instructions.
 - 1. Install flexible walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Top and bottom of each roof access ladder.
 - e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - f. Locations indicated on Drawings.
 - g. As required by roof membrane manufacturer's warranty requirements.
 - 2. Provide 6-inch (76-mm) clearance between adjoining pads.
 - 3. Adhere walkway products to substrate with compatible adhesive in accordance with roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Perform the following tests:
 - 1. Infrared Thermography: Testing agency surveys entire roof area using infrared color thermography in accordance with ASTM C1153.
 - a. Perform tests before overlying construction is placed.
 - b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
 - c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - d. Testing agency to prepare survey report of initial scan indicating locations of entrapped moisture, if any.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and in accordance with warranty requirements.

3.13 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner>.
2. Owner Address: <Insert address>.
3. Building Name/Type: <Insert information>.
4. Building Address: <Insert address>.
5. Area of Work: <Insert information>.
6. Acceptance Date: _____.
7. Warranty Period: <Insert time>.
8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 115 mph (m/s);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner

in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075323

SECTION 075423 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thermoplastic polyolefin (TPO) roofing system.
2. Accessory roofing materials.
3. Substrate board.
4. Vapor retarder.
5. Roof insulation.
6. Insulation accessories and cover board.
7. Walkways.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Thermoplastic polyolefin (TPO) roofing system.
2. Accessory roofing materials.
3. Substrate board.
4. Vapor retarder.
5. Roof insulation.
6. Insulation accessories and cover board.
7. Walkways.

- B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Tapered insulation layout, thickness, and slopes.
5. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
6. Tie-in with adjoining air barrier.

- C. Samples for Verification: For the following products:

1. Roof membrane and flashings, of color required.
2. Walkway pads or rolls, of color required.

- D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, and testing agency.
- B. Manufacturer Certificates:
 - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
 - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.
- D. Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.
- B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and listed in SPRI's Directory of Roof Assemblies for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, vapor retarder, substrate board and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and flashings to withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings to remain watertight.
 - 1. Accelerated Weathering: Roof to withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 - 2. Impact Resistance: Roof membrane to resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

- B. Material Compatibility: Roofing materials to be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
 - 1. Zone 1 (Roof Area Field): 76 lbf/sq. ft. (3.6 kPa).
 - 2. Zone 2 (Roof Area Perimeter): 120 lbf/sq. ft. (5.7kPa).
 - a. Location: From roof edge to 3 feet inside roof edge.
 - 3. Zone 3 (Roof Area Corners): 163 lbf/sq. ft. (7.8kPa).
 - a. Location: 6 feet in each direction from each building corner.
 - 4. Fire/Windstorm Classification: Class 1A-120.
 - 5. Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 SH.
- D. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and are listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
 - 1. Wind Uplift Load Capacity: 120 psf.
- E. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING SYSTEM

- A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced, fabric-backed TPO sheet.
 - 1. Basis of Design: Carlisle Syntec Systems, Fleeceback FR TPO Roofing Systems or Approved Equal.
 - 2. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.
 - 3. Thickness: 60 mils (1.5 mm), nominal.
 - 4. Exposed Face Color: Match existing.

2.3 ACCESSORY ROOFING MATERIALS

- A. General: Accessory materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 - 1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Roof Vents: As recommended by roof membrane manufacturer.
 - 1. Size: Not less than 4-inch (100-mm) diameter.
- E. Bonding Adhesive: Manufacturer's standard, water based.
- F. Slip Sheet: Manufacturer's standard, of thickness required for application.
- G. Asphalt-Coated, Glass-Fiber-Mat, Venting Base Sheet: ASTM D4897/D4897M, Type II; nonperforated, asphalt-impregnated fiberglass reinforced, with mineral granular patterned surfacing on bottom surface.
- H. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- I. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), prepunched.
- J. Ballast Retaining Bar: Perimeter securement system consisting of a slotted extruded-aluminum retention bar with an integrated compression fastening strip.
 - 1. Fasteners: 1-1/2-inch (38-mm) stainless steel fasteners with neoprene washers.
- K. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- L. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 SUBSTRATE BOARD

- A. Gypsum Board Type X: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch (16 mm).

- B. Glass-Mat Gypsum Roof Substrate Board: ASTM C1177/C1177M, water-resistant gypsum board.
 - 1. Thickness: Type X, 5/8 inch (16 mm) thick.
 - 2. Surface Finish: Factory primed.
- C. Fiber-Reinforced Gypsum Roof Board: ASTM C1278/C1278M, cellulosic-fiber reinforced, water-resistant gypsum board.
 - 1. Thickness: 5/8 inch (16 mm).
- D. Perlite Board: ASTM C728, seal coated.
 - 1. Thickness: 3/4 inch (19 mm).
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 VAPOR RETARDER

- A. Polyethylene Film: ASTM D4397, 10 mils (0.25 mm) thick, minimum, with maximum permeance rating of 0.076 perm (0.050 metric perm).
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, listed by FM Approvals for vapor retarder application.
- B. Laminated Sheet Vapor Retarder: Two-layer, fire-retardant polyethylene laminate, reinforced with cord grid.
 - 1. Basis of Design: Reef Industries, Griffolyn Type – 55FR or Approved Equal.
 - 2. Permeance Rating: Not more than 0.062 perm (3.556 ng/Pa x s x sq. m) when tested in accordance with ASTM E96/E96M.
 - 3. Flame-Spread Index: Not more than 5 when tested in accordance with ASTM E84.
 - 4. Smoke-Developed Index: Not more than 35 when tested in accordance with ASTM E84.
 - 5. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Rubberized-Asphalt-Sheet Vapor Retarder, Self-Adhering: ASTM D1970/D1970M, polyethylene film laminated to layer of rubberized asphalt adhesive, minimum 40-mil (1.0-mm) total thickness; maximum permeance rating of 0.1 perm (6 ng/Pa x s x sq. m); cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor retarder manufacturer.

2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by TPO roof membrane manufacturer, approved for use in SPRI's Directory of Roof Assemblies listed roof assemblies.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Compressive Strength: 20 psi (138 kPa).
 - 2. Size: 48 by 96 inches (1219 by 2438 mm).
 - 3. Thickness:
 - a. Base Layer: 1-1/2 inches (38 mm).
 - b. Upper Layer: 4-inches (102-mm).
- C. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Match roof insulation.
 - 2. Minimum Thickness: 1/4 inch (6.35 mm).
 - 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.7 INSULATION ACCESSORIES AND COVER BOARD

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
- C. Glass-Mat Gypsum Cover Board: ASTM C1177/C1177M, water-resistant gypsum board.
 - 1. Thickness: 5/8 inch (16 mm).
 - 2. Surface Finish: Fiberglass facer, Factory primed.

2.8 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.
 - 1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
 - 2. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F2170.
 - a. Test Frequency: One test probe per each 1000 sq. ft. (93 sq. m), or portion thereof, of roof deck, with not less than three tests probes.
 - b. Submit test reports within 24 hours after performing tests.
 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 7. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.
 8. Verify that minimum curing period recommended by roofing system manufacturer for lightweight insulating concrete roof decks has passed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
1. Submit test result within 24 hours after performing tests.

- a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.
- C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 INSTALLATION OF SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 2. Tightly butt substrate boards together.
 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

3.5 INSTALLATION OF VAPOR RETARDER

- A. Laminate Sheet: Loosely lay laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches (50 and 150 mm), respectively.
 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 2. Continuously seal side and end laps with tape.
- B. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 and 6 inches (90 and 150 mm), respectively.
 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 2. Seal laps by rolling.

- C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Locate end joints over crests of decking.
 - b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - 1) Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).

- 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- D. Installation Over Concrete Decks:
1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

- f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- E. Installation Over Lightweight Insulating Concrete Decks:
- 1. Mechanically fasten vented base sheet to lightweight insulating concrete, with vented side down, using mechanical fasteners specifically designed and sized for fastening to lightweight insulating concrete decks.
 - a. Fasten vented base sheet according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
 - b. Fasten vented base sheet to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 2. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - 1) Set insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
 - 3. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.

- b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
- d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - 1) Trim insulation so that water flow is unrestricted.
- e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
- f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- g. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 - 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 4. Adhere cover board to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 INSTALLATION OF ADHERED ROOF MEMBRANE

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

- B. Unroll roof membrane and allow to relax before installing.
- C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- E. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- I. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.9 INSTALLATION OF BASE FLASHING

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.10 INSTALLATION OF WALKWAYS

- A. Flexible Walkways:

1. Install flexible walkways at the following locations:
 - a. Retain one or more subparagraphs below. Revise to suit Project.
 - b. Perimeter of each rooftop unit.
 - c. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - d. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - e. Top and bottom of each roof access ladder.
 - f. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - g. Locations indicated on Drawings.
 - h. As required by roof membrane manufacturer's warranty requirements.
2. Provide 6-inch (76-mm) clearance between adjoining pads.
3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Perform the following tests:
 1. Infrared Thermography: Testing agency surveys entire roof area using infrared color thermography according to ASTM C1153.
 - a. Perform tests before overlying construction is placed.
 - b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
 - c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - d. Testing agency to prepare survey report of initial scan indicating locations of entrapped moisture, if any.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

- 1. Owner: <Insert name of Owner>.
- 2. Owner Address: <Insert address>.
- 3. Building Name/Type: <Insert information>.
- 4. Building Address: <Insert address>.
- 5. Area of Work: <Insert information>.
- 6. Acceptance Date: _____.
- 7. Warranty Period: <Insert time>.
- 8. Expiration Date: _____.

- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

- D. This Warranty is made subject to the following terms and conditions:

- 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 115 mph (m/sec);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

- e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075423

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

- 1) UL in its "Fire Resistance Directory."
- 2) Intertek Group in its "Directory of Listed Building Products."
- 3) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Specified Technologies Inc.; EZ-Path® Series, FyreFlange® HVAC Firestop Angle, SpecSeal® Intumescent Firestop Plug, SpecSeal® LC Endothermic Firestop Sealant or comparable product by one of the following:
 - a. 3M Fire Protection Products
 - b. A/D Fire Protection Systems Inc.
 - c. Construction Solutions
 - d. Grabber Construction Products
 - e. Hilti, Inc.
 - f. HOLDRITE.
 - g. NUCO Inc.
 - h. Passive Fire Protection Partners.
 - i. RectorSeal.
 - j. STC Sound Control.
 - k. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- F. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
 - 4. Stack Fitting: ASTM A48/A48M, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
 - 5. Special Coating: Corrosion resistant on interior of fittings.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a 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 intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

- 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.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.

3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Contractor will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes joint sealers for the following locations:

- B. Sealant A:

- 1. For interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below use one of the specified acrylic emulsion sealants, except as otherwise specified.
- 2. Perimeter interior joints of exterior openings.
- 3. Vertical control joints on exposed surfaces of interior unit masonry walls and partitions.
- 4. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and borrowed lights.

- C. Sealant B:

- 1. Toilet Rooms: For perimeter joints of toilet fixtures, urinals, and lavatories; use one of the specified mildew-resistant silicone sealants.

- D. Sealant C:

- 1. Sealing concealed perimeter joints of gypsum drywall partitions to reduce sound transmission characteristics.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.

- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- D. Joint-Sealant Schedule: Include the following information:

- 1. Joint-sealant application, joint location, and designation.
- 2. Joint-sealant manufacturer and product name.
- 3. Joint-sealant formulation.
- 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:
 - 1. Joint-sealant location and designation.
 - 2. Manufacturer and product name.
 - 3. Type of substrate material.
 - 4. Proposed test.
 - 5. Number of samples required.
- D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- F. Field-Adhesion-Test Reports: For each sealant application tested.
- G. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in con-

- tact with stone, precast and masonry substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
 7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 2. Conduct field tests for each kind of sealant and joint substrate.
 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not

comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors: Provide colors of exposed joint sealers to match color of materials adjacent to joints. Provide the number of different sealant colors including custom colors as required for the color matching as directed by the Architect.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses.

1. Type S: Single component/one-part.
2. Type M: Multi-component/two or more parts.
3. Grade P: Pourable for horizontal surfaces.
4. Grade NS: Non-sag for vertical surfaces.
5. Class 25: Tested range +/- 25% of joint width.
6. Use T: Suitable for surfaces subject to traffic.
7. Use NT: Non-traffic surfaces.

2.2 JOINT SEALANTS

A. SEALANT A

1. Acrylic-Emulsion Sealant: Manufacturer's standard, one part, nonsag, mildew-resistant, acrylic-emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior and on protected exterior locations involving joint movement of not more than plus or minus 5 percent.
2. Acceptable Product: Provide one of the following:
 - a. Bostik Findley; Chem-Calk 600.
 - b. Pecora Corporation; AC-20+.
 - c. Schnee-Morehead, Inc.; SM 8200.
 - d. Sonneborn, Division of ChemRex Inc.; Sonolac.
 - e. Tremco; Tremflex 834.

B. SEALANT B

1. One-Part Mildew-Resistant Silicone Sealant: Type S; Grade NS; Class 25; Use NT; formulated with fungicide; intended for sealing interior joints with nonporous substrates and subject to in-service exposure to conditions of high humidity and temperature extremes.
2. Acceptable Products: Provide one of the following:
 - a. Dow Corning Corporation; 799.
 - b. GE Silicones; UltraGlaze SSG4000.
 - c. GE Silicones; UltraGlaze SSG4000AC.
 - d. Polymeric Systems Inc.; PSI-631.
 - e. Schnee-Morehead, Inc.; SM5731 Poly-Glaze Plus.
 - f. Tremco; Tremsil 600
 - g. Tremco; Tremsil 200

C. SEALANT C

1. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - a. Product has flame spread and smoke developed ratings of less than 25 per ASTM 84 for fire rated wall application.
2. Available Products: Subject to compliance with requirements acoustical joint sealants that may be incorporated in the Work include, but not limited to, the following:

- a. Acoustical Sealant:
 - 1) "SHEETROCK Acoustical Sealant", United States Gypsum Co.
 - 2) "AC-20 FTR Acoustical and Insulation Sealant," Pecora Corp.
 - 3) "SpecSeal Smoke 'N' Sound Sealant", Specified Technologies, Inc.
- b. Acoustical Sealant for Concealed Joints:
 - 1) "BA-98", Pecora Corp.
 - 2) "Tremco Acoustical Sealant," Tremco, Inc.
 - 3) "Sealant Sound Control", Grabber Construction Products, Inc.

2.3 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealants backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - d. Exterior insulation and finish systems.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
 4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.
 5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed, and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:

- a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Acoustical joint sealants.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants, showing full range of available colors for each product exposed to view.
- C. Samples for Verification: For each type and color of acoustical joint sealant required.
 - 1. Size: 1/2-inch- (13-mm-) wide sealant joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Acoustical Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty Documentation:
 - 1. Manufacturers' special warranties.
 - 2. Installer's special warranties.

1.5 WARRANTY

- A. Installer's Special Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACOUSTICAL JOINT SEALANTS

- A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.
- B. Acoustical Sealant for Exposed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Specified Technologies, Inc.; SpecSeal Smoke 'N' Sound Sealant or comparable product by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials, Inc.
 - b. Hilti, Inc.
 - c. Pecora Corporation.
 - d. Tremco Incorporated.
 - e. USG Corporation.
 - 2. STC Rating: 62 at 1/2 inch (13mm) wet thickness on construction complying with ASTM E90/ASTM C919.
 - 3. Exposed Joint Sealant: Flame-spread and smoke-development indexes of less than 5 and zero, respectively, as determined per ASTM E84.
 - 4. VOC Content: 20g/L or less.
 - 5. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.
- C. Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.
 - 1. Pecora Corporation.
 - 2. SpecSeal Smoke 'N' Sound Sealant, Specified Technologies, Inc.
 - 3. Sealant Sound Control, Grabber Construction Products, Inc.

2.2 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written

instructions for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

SECTION 081213 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior standard steel frames.
 - 2. Borrowed lites.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, fire-resistance ratings, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each frame type.
 - 2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 3. Locations of reinforcement and preparations for hardware.
 - 4. Details of each different wall opening condition.

5. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.

C. Samples for Verification:

1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 127 mm).

D. Product Schedule: For hollow-metal frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal frame assembly and fire-rated borrowed-lite assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Store hollow-metal frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Titan Metal Products; Builders Series 20-90 Minute Frames and Borrowed lites; or comparable product by one of the following:
1. Ceco Door; ASSA ABLOY.
 2. Curries Company; ASSA ABLOY.
 3. Mesker Door Inc.
 4. Republic Doors and Frames.
 5. Steelcraft; an Allegion brand.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 STANDARD STEEL FRAMES

- A. Construct hollow-metal frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Interior Frames: SDI A250.8.
 - 1. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
 - 2. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
 - 3. Construction: Knocked down.
 - 4. Exposed Finish: Factory.

2.4 BORROWED LITES

- A. Fabricate of metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
- B. Construction: Knocked down.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.5 FRAME ANCHORS

- A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Glazing: Comply with requirements in Section 088000 "Glazing."

2.7 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
 4. Terminated Stops: Terminate stops 6 inches (152 mm) above finish floor with a 90-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- B. Hardware Preparation: Factory prepare hollow-metal frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal frames for hardware.
- C. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 2. Provide fixed frame moldings on outside of exterior and on secure side of interior frames. Provide loose stops and moldings on inside of hollow-metal frames.
 3. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 4. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.8 STEEL FINISHES

- A. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.
1. Color and Gloss: As selected by Architect from manufacturer's full range; Dark Bronze.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Drill and tap frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. General: Install hollow-metal frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions. Comply with SDI A250.11 or NAAMM-HMMA 840.
- B. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - 1. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - 2. Install frames with removable stops located on secure side of opening.
- C. Fire-Rated Openings: Install frames according to NFPA 80.
- D. Floor Anchors: Secure with postinstalled expansion anchors.
 - 1. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
- E. Solidly pack mineral-fiber insulation inside frames.
- F. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
- G. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- H. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- I. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

- A. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

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- B. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

END OF SECTION 081213

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Five-ply flush wood veneer-faced doors for transparent finish.
2. Five-ply flush wood doors for opaque finish.
3. The intent of the flush wood door specification is to specify doors for interior use, while matching existing building standards. However, it is the door supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the door specification.
4. Reuse existing doors where applicable. Remove and salvage existing doors in like new condition. Contractor to label and store doors for possible reuse.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door louvers.
5. Door trim for openings.
6. Door frame construction.
7. Factory-machining criteria.
8. Factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.

C. Samples for Initial Selection: For factory-finished doors.

- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
 - 1. F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
- B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Doors, Solid-Core Five-Ply Veneer-Faced – Reference Finish Legend on Sheet A-140:
 - 1. Basis of Design: Match existing building standards, or subject to compliance with requirements provide product by one of the following:
 - a. Masonite Architectural.
 - b. Oshkosh Door Company.
 - c. VT Industries, Inc.
 - 2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
 - 3. Architectural Woodwork Standards Grade: Custom.
 - 4. Faces: Single-plywood veneer not less than 1/50 inch (0.508 mm) thick.
 - a. Species: Match existing building standards.
 - b. Cut: Match existing building standards.
 - c. Match between Veneer Leaves: Match existing building standards.
 - d. Assembly of Veneer Leaves on Door Faces: Match existing building standards.
 - e. Pair and Set Match: Provide for doors hung in same opening.
 - 5. Exposed Vertical Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors:
 - a) Finish steel edges and astragals to match door hardware (locksets or exit devices).

- c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 475 lbf (2110 N) in accordance with WDMA T.M. 10.
- 6. Core for Non-Fire-Rated Doors:
 - a. ANSI A208.1, Grade LD-2 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - 2) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087111 "Door Hardware (Descriptive Specification)."
 - b. Glued wood stave.
 - c. WDMA I.S. 10 structural composite lumber.
 - 1) Screw Withdrawal, Vertical Door Edge: 475 lbf (2110 N).
 - d. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
- 7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
- 8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD DOORS FOR OPAQUE FINISH

- A. Interior Doors, Solid-Core Five-Ply – Reference Finish Legend on Sheet A-140:
 - 1. Basis of Design: Match existing building standards, or subject to compliance with requirements provide product by one of the following:
 - a. Masonite Architectural.
 - b. Oshkosh Door Company.
 - c. VT Industries, Inc.
 - 2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
 - 3. Architectural Woodwork Standards Grade: Custom.
 - 4. Faces: Any closed-grain hardwood of mill option.

- a. Apply MDO to standard-thickness, closed-grain, hardwood face veneers or directly to high-density hardboard crossbands.
 - b. Hardboard Faces: ANSI A135.4, Class 1 (tempered) or Class 2 (standard).
 - c. MDF Faces: ANSI A208.2, Grade 150 or Grade 160.
5. Exposed Vertical Edges: Any closed-grain hardwood.
- a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - 1) Screw-Holding Capability: 475 lbf (2110 N) in accordance with WDMA T.M. 10.
6. Core for Non-Fire-Rated Doors:
- a. ANSI A208.1, Grade LD-2 particleboard.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
 - 2) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087111 "Door Hardware (Descriptive Specification.)"
 - b. Glued wood stave.
 - c. WDMA I.S. 10 structural composite lumber.
 - 1) Screw Withdrawal, Door Face: 475 lbf (2110 N).
 - 2) Screw Withdrawal, Vertical Door Edge: 475 lbf (2110 N).
 - d. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
- a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 - 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 - 1. Locate hardware to comply with DHI-WDHS-3.
 - 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 - 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 - 4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
 - 5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
 - 6. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.5 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
 - 3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Architectural Woodwork Standards System-10, UV Curable, Water Based.
 - 2. Staining: Match existing building standard.
 - 3. Sheen: Satin.
- D. Opaque Finish:
 - 1. Architectural Woodwork Standards, ANSI/WDMA I.S. 1A Grade: Premium.
 - 2. Architectural Woodwork Standards System-10, UV Curable, Water Based.
 - 3. Color: Match building standard.
 - 4. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087111 "Door Hardware (Descriptive Specification)."
- B. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install frames level, plumb, true, and straight.
 - 1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3.2 mm in 2400 mm).
 - 2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
 - 3. Install fire-rated doors and frames in accordance with NFPA 80.
 - 4. Install smoke- and draft-control doors in accordance with NFPA 105.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

- C. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Access doors and frames.
2. Fire-rated access doors and frames.

B. Related Requirements:

1. Section 233300 "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum **6 by 6 inches (150 by 150 mm)** in size.

C. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing and inspecting agency.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

1.4 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies meets the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

- A. Flush Access Doors with Concealed Flanges – Alternate #5, 1/A-701:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACUDOR Products, Inc.
 - b. J. L. Industries, Inc.; Activar Construction Products Group, Inc.
 - c. Larsen's Manufacturing Company.
2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Optional Features: Concealed pivoting rod hinge.
4. Locations: Ceiling.
5. Door Size: 24-inch (610 mm) by 24-inch (610 mm).
6. Uncoated Steel Sheet for Door: Nominal **0.060 inch (1.52 mm)**, 16 gage, factory primed.
7. Frame Material: Same material and thickness as door.
8. Latch and Lock: Cam latch, flat head screw driver driven.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES – Enlarged Plan 4/A-401:

- A. Fire-Rated, Flush Access Doors with Exposed Flanges

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ACUDOR Products, Inc.
 - b. J. L. Industries, Inc.; Activar Construction Products Group, Inc.

c. Larsen's Manufacturing Company.

2. Description: Door face flush with frame, uninsulated; with exposed flange, self-closing door, and concealed hinge.
3. Optional Features: Concealed hinge.
4. Locations: Wall.
5. Door Size: 24-inch (610 mm) by 24-inch (610 mm).
6. Fire-Resistance Rating: Not less than 2 hours.
7. Temperature-Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
8. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gag, factory primed.
9. Frame Material: Same material, thickness, and finish as door.
10. Latch and Lock: Self-latching door hardware, operated by knurled-knob.

2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- D. Frame Anchors: Same material as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.

- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
- E. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
 - 2. Keys: Furnish two keys per lock and key all locks alike.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Paint primed door and frame to match scheduled wall or ceiling finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, Section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

SECTION 084213 - ALUMINUM-FRAMED ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Aluminum-framed entrance door systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 3. Show connection to and continuity with adjacent construction.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.3 INFORMATIONAL SUBMITTALS

- A. Certificates:

1. Energy Performance Certificates: For aluminum-framed entrances, accessories, and components, from manufacturer.
 - a. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance.

B. Qualification Statements:

1. For Installer.

C. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For aluminum-framed entrances.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installers: An entity that employs installers and supervisors who are trained and approved by manufacturer and that employs a qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
- b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
- c. Cracking, peeling, or chipping.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer Aluminum Entrances, 190 Swing Door; Narrow stile, 2-1/8" (54 mm) vertical face dimension, 2-1/4" (58 mm) top rail, 10" (254 mm) optional bottom rail, 1-3/4" (44.5 mm) depth, moderate traffic applications or comparable product by one of the following:
 - 1. Oldcastle Building Envelope, A CRH Company.
 - 2. U.S. Aluminum; A Brand of C.R. Laurence
 - 3. YKK AP America, Inc.
- B. Source Limitations: Obtain all components of aluminum-framed entrance, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Loads:
 - 1. Wind Loads: 20 PSF.
- C. Structural: Test in accordance with ASTM E330/E330M as follows:
 - 1. When tested at 150 percent of positive and negative wind-load design pressures, entrance doors, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 - 2. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:
 - 1. No evidence of water penetration through fixed glazing and framing areas of entrance doors when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- E. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
 - 1. Air Leakage:

- a. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
2. Condensation Resistance Factor (CRF):
 - a. Entrance Doors: CRF of not less than 57 as determined in accordance with AAMA 1503.

2.3 ALUMINUM-FRAMED ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
 1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 2. Door Design: Narrow stile; 2-1/8-inch (54-mm) nominal width.
 3. Glazing Stops and Gaskets: Beveled or Square, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
 4. Door Finish: Color anodic finish. Basis-of-Design Product: Kawneer Anodize finishes; #29 Black, AA-M10C21A44 Architectural Class I, (.7 mils minimum). Or subject to compliance with requirements.
- B. Framing Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch (3.2 mm) thick and reinforced as required to support imposed loads.
 1. Nominal Size: 1-3/4 by 4-1/2 inches (45 by 115 mm).
 2. Interior Framing Construction: Nonthermal.
 3. Finish: Match door finish.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Materials:
 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B209 (ASTM B209M).
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).
 - c. Structural Profiles: ASTM B308/B308M.

2.4 ENTRANCE DOOR HARDWARE

- A. General: Provide entrance door hardware and for each entrance door, to comply with requirements in this Section.
 - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated.
 - 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- B. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.

C.

2.5 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

2.6 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- G. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.8 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, AA-M10C21A44, Class I, 0.018 mm or thicker.
 - 1. Color: Black.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

- A. Install glazing as specified.

3.4 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.
 - 1. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.5 MAINTENANCE SERVICE

A. Entrance Door Hardware Maintenance:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

3.6 ENTRANCE DOOR HARDWARE SETS

A. Hardware Group No, 01

2 EA Pull	RM301 1 1/4" Dia. 12" CTC BTB	US32D316	Rockwood
1 EA Continuous Hinge	Concealed Roton Hinge	Black	Hager
1 EA Deadlock Lever	4550 MS Deadlock Lever	Alum	Adams Rite
1 EA Deadlock	MS 1850S Deadlock	Alum	Adams Rite
1 EA Door Stop	436	US26D	Ives
1 EA	Cylinder		
3 EA	Silencers		

END OF SECTION 084213

SECTION 087111 - DOOR HARDWARE (Descriptive Specification)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanical door hardware for: Swinging doors.
2. Field verification, preparation and modification of existing doors and frames to receive new hardware.
3. The intent of the hardware specification is to specify hardware for interior doors, while matching existing building standards. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specification.
4. Reuse existing door hardware where applicable. All new and existing to be reused hardware to comply with Accessibility requirements. Contractor to label and store hardware for possible reuse.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

1. Cabinets (casework), including locks in cabinets
2. Toilet Partitions
3. Operable / Folding Partition egress doors

C. Related Requirements:

1. Section 081213 "Hollow Metal Frames" for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.
2. Section 081416 "Flush Wood Doors" for astragals and integral intumescent seals provided as part of labeled fire-rated assemblies.
3. Section 083113 "Aluminum-Framed Entrances" for entrance door hardware, cylinders.
4. Section 087113 "Power Door Operators" for low-energy power operators and low-energy power-assist operators.

1.2 COORDINATION

A. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.3 ACTION SUBMITTALS

- A. Product Data: Technical product data for each type of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- B. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - 1. Wiring Diagrams: For power, signal, and control wiring and indicating:
 - a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
- C. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - 1. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- D. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - 1. Quantity, type, style, function, size, and finish of each hardware item.
 - 2. Name and manufacturer of each item.
 - 3. Fastenings and other pertinent information.
 - 4. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 5. Mounting locations for hardware.
 - 6. Door and frame sizes, and materials.
 - 7. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, and access control components). Operations description should include: egress, ingress (access), and fire / smoke alarm connections.
 - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
- E. Keying Schedule: Keyway Interchangeable Cores to be turned over to the owner (FMDC). FMDC with set cores and cut keys.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Architectural Hardware Consultant.
- B. Product Certificates: For each type of electrified door hardware.

1. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
1. Factory order acknowledgement numbers (for warranty and service).
 2. Name, address, and phone number of local representative for each manufacturer.
 3. Parts list for each product.
 4. Final approved hardware schedule, edited to reflect conditions as-installed.

1.6 QUALITY ASSURANCE

- A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.8 WARRANTY

- A. Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Electromagnetic Locks: Five years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: 10 years from date of Substantial Completion.
 - d. Concealed Floor Closers: Five years from date of Substantial Completion.

1.9 MAINTENANCE

- A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2.2 PERFORMANCE REQUIREMENTS

- A. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested in accordance with UL 1784 and installed in compliance with NFPA 105.
 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- B. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1.
 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.

- b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
- c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.

2.3 HINGES

- A. Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 1. Basis of Design: Match existing building standards, or subject to compliance with requirements provide product by one of the following:
 - a. Allegion plc.
 - b. Hager Companies.
 - c. Ives Hinges.
 - d. Stanley Commercial Hardware; a division of Stanley Security Solutions.
- B. Antifriction-Bearing Hinges:
 1. Mounting: Full mortise (butts).
 2. Bearing Material: Ball bearing.
 3. Grade 1 (heavy weight).
 4. Base and Pin Metal:
 - a. Interior Hinges: Brass with stainless steel pin body and brass protruding heads.
 - b. Hinges for Fire-Rated Assemblies: Steel with steel pin.
 5. Pins: Non-rising loose unless otherwise indicated.
 - a. Outswinging Corridor Doors with Locks: Maximum security.
 6. Tips: Flat button.
 7. Corners: Square.
 8. Features: Raised barrel.

2.4 ELECTROMAGNETIC LOCKS

- A. Electromagnetic Locks: BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.
 1. Security Door Controls (SDC); 1570 Series.
 2. Direct-Hold Type: Lock mounted on bottom of header.
 3. Strength Ranking: 1200 lbf (5338 N).
 4. Inductive Kickback Peak Voltage: Not more than 53 V.
 5. Residual Magnetism: Not more than 4 lbf (18 N) to separate door from magnet.
 6. Features:
 - a. Magnetic bond sensor.

2.5 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
 - 1. Von Duprin; Allegion.
- B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing in accordance with UL 305.
- C. Rim Exit Devices: Grade 1.
 - 1. Type: 1, rim.
 - 2. Actuating Bar: Push pad.
 - 3. Material: Stainless steel.
- D. Concealed Vertical-Rod Exit Devices: Grade 1.
 - 1. Type: 7, for wood doors.
 - 2. Actuating Bar: Push pad.
 - 3. Material: Stainless steel.
 - 4. Configuration: Top and bottom rods.
- E. Exit Device Outside Trim: Lever with cylinder or Pull with cylinder as indicated; material and finish to match locksets unless otherwise indicated.
 - 1. Match design for lock trim unless otherwise indicated.

2.6 LOCK CYLINDERS

- A. Lock Cylinders:
 - 1. Building Standard:
 - a. Best Access Systems; Stanley Security Solutions, Inc. – 7KC Series
- B. Standard Lock Cylinders: BHMA A156.5; Grade 2 permanent cores; face finished to match lockset.
 - 1. Core Type: Interchangeable.
 - 2. Number of Pins: Seven.
 - 3. Lock Type: Rim type.
 - 4. Function: As indicated in hardware schedule.
 - 5. Finish: 626 – Satin Chromium Plated
 - 6. Strike Plate: 6KS3
 - 7. Keyway Type: Type L Interchangeable Cores (1C7L1626)
 - a. All interchangeable cores to be turned over to Owner (FMDC). FMDC will set cores and cut keys.

2.7 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on

size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Corbin Russwin, Inc.; an ASSA ABLOY Group company.
 - b. Hager Companies.
 - c. Stanley Commercial Hardware; a division of Stanley Security Solutions.
- B. Surface Closer with Cover: Grade 1; Modern type with mechanism enclosed in cover.
 1. Mounting: Regular arm mounting.
 2. Type: Regular arm
 3. Backcheck: Factory preset and Adjustable, effective between 60 and 85 degrees of door opening.
 4. Cover Material: Molded plastic.
 5. Closing Power Adjustment: At least 15 percent more than minimum tested value.

2.8 MECHANICAL STOPS AND HOLDERS

- A. Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 1. Basis of Design: Match existing building standards, or subject to compliance with requirements provide product by one of the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Hager Companies.
 - c. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
- B. Dome-Type Floor Stop: Grade 1; with minimum 1-inch- (25-mm-) high bumper for doors without threshold and 1-3/8-inch- (35-mm-) high bumper for doors with threshold.

2.9 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. National Guard Products, Inc.
 - c. Pemko; an ASSA ABLOY Group Company.
- B. Maximum Air Leakage: When tested in accordance with ASTM E283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
3. Gasketing on Double Doors: 0.50 cfm per ft. (0.000774 cu. m/s per m) of door opening.

- C. Adhesive-Backed Perimeter Gasketing: Silicone gasket material applied to frame rabbet with self-adhesive.

2.10 AUXILIARY ELECTRIFIED DOOR HARDWARE

- A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; listed and labeled for use with fire-alarm systems.
- B. Door Position Switches: Magnetically operated reed switch designed for concealed mounting.
- C. Door and Frame Transfer Devices: Steel housing for mortise in hinge stile of door, with flexible tube for wiring bundle; accommodating doors that swing open to 120 degrees.

2.11 FABRICATION

- A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2.12 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 1. Furnish permanent cores to Owner for installation.
- E. Key Control System:
 1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
 2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.
 3. Key Control System Software: Set up multiple-index system based on final keying schedule.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Owner (FMDC).
 1. Configuration: Provide [one power supply for each door opening] [least number of power supplies required to adequately serve doors] with electrified door hardware.
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
 - 2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DOOR HARDWARE SCHEDULE

- A. Hardware items are referenced in the following hardware. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- B. Hardware Sets: Reference Door Schedules on sheet A-600 for additional information.
 - 1. Hardware Group No. 1 – Single Door Office Lock Function
Provide each SGL door(s) with the following:
Hardware:
 - 3-4 EA. Hinges with Bearings [Doors 7'-6" high or taller to receive (4) hinges. Doors less than 7'-6" high to receive (3) hinges.]
 - 1 EA. Lever Handle with AB-Entry function

- 1 EA. Floor Mounted Doorstop
 - 3 EA. Door Silencers
2. Hardware Group No. 2 – Single Door Conference Passage Function
Provide each SGL door(s) with the following:
Hardware:
- 3-4 EA. Hinges with Bearings [Doors 7'-6" high or taller to receive (4) hinges. Doors less than 7'-6" high to receive (3) hinges.]
 - 1 EA. Lever Handle with N-Passage function
 - 1 EA. Floor Mounted Doorstop
 - 3 EA. Door Silencers
3. Hardware Group No. 3 – Single Door Mechanical/Electrical/Data Locking Function
Provide each SGL door(s) with the following:
Hardware:
- 3-4 EA. Hinges with Bearings [Doors 7'-6" high or taller to receive (4) hinges. Doors less than 7'-6" high to receive (3) hinges.]
 - 1 EA. Lever Handle with D-Storeroom function
 - 1 EA. Floor Mounted Doorstop
 - 3 EA. Door Silencers
4. Hardware Group No. 4 – Single Door Single Use Restroom/Wellness Room Locking Function
Provide each SGL door(s) with the following:
Hardware:
- 3-4 EA. Hinges with Bearings [Doors 7'-6" high or taller to receive (4) hinges. Doors less than 7'-6" high to receive (3) hinges.]
 - 1 EA. Lever Handle with L-Privacy function
 - 1 EA. Floor Mounted Doorstop
 - 1 EA. Door Closer
 - 3 EA. Door Silencers
5. Hardware Group No. 5 – Single Café Door Locking Function
Provide each SGL door(s) with the following:
Hardware:
- 4 EA. Hinges with Bearings
 - 1 EA. Exit Device, On push side of door with optional pull.
 - 1 EA. Ladder Door Pull
 - 3 EA. Door Silencers
6. Hardware Group No. 6 – Single Door with Card Access
Provide each SGL door(s) with the following: Refer to Specification Section 281500 Integrated Access Control Hardware Devices for additional information.
Hardware:
- 3-4 EA. Hinges with Bearings [Doors 7'-6" high or taller to receive (4) hinges. Doors less than 7'-6" high to receive (3) hinges.]
 - 1 EA. Exit Device, On push side of door with lever handle.
 - 1 EA. Magnetic Lock
 - 1 EA. Badge Reader - Proximity

- 1 EA. Motion Rex
 - 1 EA. Push Button Rex
 - 1 EA. Door Contact
 - 1 EA. Power Supply
 - 1 EA. Floor Mounted Doorstop
 - 1 EA. Door Closer
 - 3 EA. Door Silencers
7. Hardware Group No. 7 – Double Door with Card Access
Provide each PR door(s) with the following: Refer to Specification Section 281500 Integrated Access Control Hardware Devices for additional information.
Hardware:
- 6 EA. Hinges with Bearings
 - 2 EA. Lever Handle IDT-Dummy function
 - 1 EA. Double Magnetic Lock
 - 1 EA. Badge Reader - Proximity
 - 1 EA. Motion Rex
 - 1 EA. Push Button Rex
 - 1 EA. Door Contact
 - 1 EA. Power Supply
 - 2 EA. Floor Mounted Doorstop
 - 2 EA. Door Closer
 - 6 EA. Door Silencers
 - 2 EA. Smoke Seals (top, bottom, & sides)
 - 2 EA. Dustproof Strike
8. Hardware Group No. 8 – Single RR Door with Automatic Opener
Provide each existing SGL door(s) with the following: Refer to Specification Section 087113 Power Operators for additional information.
Hardware:
- 1 EA. Automatic Door Opener
 - 2 EA. Wall Mounted Push Paddle Actuators
9. Hardware Group No. 9 – Double Door with Passage Function
Provide each existing PR door(s) with the following:
Hardware:
- 6 EA. Hinges with Bearings
 - 2 EA. Lever Handle with N-Passage function
 - 2 EA. Exit Device, On push side of door
 - 2 EA. Floor Mounted Doorstop
 - 6 EA. Door Silencers
10. Hardware Group No. 10 – Double Door with Locking Function
Provide each existing PR door(s) with the following:
Hardware:
- 6 EA. Hinges with Bearings
 - 1 EA. Lever Handle with D-Storeroom function
 - 1 EA. Leven Handle IDT-Dummy function
 - 2 EA. Floor Mounted Doorstop
 - 6 EA. Door Silencers

11. Hardware Group No. 11 – Existing Double Door with Card Access
Provide each existing PR door(s) with the following:

Hardware:

- 1 EA. Double Magnetic Lock
- 1 EA. Badge Reader - Proximity
- 1 EA. Motion Rex
- 1 EA. Push Button Rex
- 1 EA. Door Contact
- 1 EA. Power Supply
- 2 EA. Door Closer (if not existing)
- 2 EA. Dustproof Strike (if not existing)

END OF SECTION 087111

SECTION 087113 - POWER DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Low-energy door operators for swinging doors.

Related Requirements:

1.2 DEFINITIONS

- A. AAADM: American Association of Automatic Door Manufacturers.
- B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.
- C. Double-Egress (Doors): A pair of doors that simultaneously swing, with the two doors moving in opposite directions with no mullion between them.
- D. Double-Swing (Doors): A pair of doors that swing, with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.
- E. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.
- F. For automatic door terminology, see BHMA A156.19 for definitions of terms.

1.3 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed control mats that control power door operators. Concrete, reinforcement, and formwork requirements are specified elsewhere.
- B. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing power door operators.
- C. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.
- D. Electrical System Roughing-in: Coordinate layout and installation of power door operators with connections to the following:
1. Power supplies.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for power door operators.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For power door operators.
 - 1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
 - 2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Indicate locations of activation and safety devices.
 - 4. Include diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of power door operator.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For power door operators, safety devices, and control systems, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of power door operators that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Faulty or sporadic operation of power door operator, including controls.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Match building standard style and finish, or subject to compliance with requirements provide product by one of the following:
1. Besam; ASSA ABLOY.
 2. Horton Automatics.
 3. LCN; Allegion.
 4. STANLEY Access Technologies LLC; STANLEY Security Solutions, Inc.
- B. Source Limitations: Obtain power door operators, including activation and safety devices, from single source from single manufacturer.

2.2 POWER DOOR OPERATORS, GENERAL

- A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and in accordance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.
- B. Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation-and safety-device wiring, and manual operation, including spring closing when power is off.
- C. Hinges: See Section 087111 "Door Hardware (Descriptive Specification)" for hinge type for each door that door operator shall accommodate.
- D. Cover for Surface-Mounted Operators: Fabricated from 0.125-inch- (3.2-mm-) thick, extruded or formed aluminum; manufacturer's standard width; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.
- E. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.

- F. 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.

2.3 LOW-ENERGY DOOR OPERATORS FOR SWINGING DOORS

- A. Standard: BHMA A156.19.
- B. Performance Requirements:
 - 1. Opening Force if Power Fails: Not more than 15 lbf (67 N) required to release latch if provided, not more than 30 lbf (133 N) required to manually set door in motion, and not more than 15 lbf (67 N) required to fully open door.
 - 2. Entrapment-Prevention Force: Not more than 15 lbf (67 N) required to prevent stopped door from closing or opening.
- C. Configuration, Single: Operator to control single swinging door.
 - 1. Traffic Pattern: One way.
 - 2. Operator Mounting: Surface.
- D. Operation: Power opening and spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.
- E. Operating System: Electromechanical.
- F. Microprocessor Control Unit: Solid-state controller.
- G. Features:
 - 1. Adjustable opening and closing speed.
 - 2. Adjustable opening and closing force.
 - 3. Adjustable backcheck.
 - 4. Adjustable hold-open time from zero to 30 seconds.
 - 5. Adjustable time delay.
 - 6. Adjustable acceleration.
 - 7. Obstruction recycle.
 - 8. On-off/hold-open switch to control electric power to operator.
- H. Activation Device: Push-plate switch on each side of door to activate door operator.
- I. Exposed Finish: Baked-enamel or powder-coat finish, match existing.

2.4 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extrusions: ASTM B221 (ASTM B221M).
 - 2. Sheet: ASTM B209 (ASTM B209M).
- B. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.5 CONTROLS

- A. General: Provide controls, including activation and safety devices, in accordance with BHMA standards; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.
- B. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed in plastic housing; adjustable to provide detection field sizes and functions required by BHMA A156.10.
 - 1. Provide capability for switching between bidirectional and unidirectional detection.
 - 2. For one-way traffic, sensor on egress side shall not be active when doors are fully closed.
- C. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.
- D. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.
- E. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator with contrasting-colored, engraved message.
 - 1. Configuration:
 - a. Square push plate with 4-by-4-inch (100-by-100-mm) junction box.
 - 1) Mounting: Recess mounted, semiflush in wall.
 - 2. Push-Plate Material: Stainless steel as selected by Architect from manufacturer's full range.
 - 3. Message: International symbol of accessibility and "Push to Open."

2.6 ACCESSORIES

- A. Signage: As required by cited BHMA standard for type of door and its operation.
 - 1. Application Process: Decals.
 - 2. Provide sign materials with instructions for field application when operators are installed.

2.7 FABRICATION

- A. Factory fabricate power door operators to comply with indicated standards.
- B. Form aluminum shapes before finishing.
- C. Fabricate exterior components to drain condensation and water-passing joints within operator enclosure to the exterior.
- D. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

2.8 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary, protective covering before shipping.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of power door operators.

- B. Examine roughing-in for electrical systems to verify actual locations of power connections before power door operator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install power door operators in accordance with manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.
 - 1. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.
 - 2. Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.
- B. Controls: Install activation and safety devices in accordance with manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel. Connect control wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

3.3 FIELD QUALITY CONTROL

- A. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Test and inspect each power door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.
- C. Power door operators will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust power door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

- B. After completing installation of power door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.
- C. Readjust power door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).
- D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include three months' full maintenance by skilled employees of power door operator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain power door operators.

END OF SECTION 087113

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.
2. Glazing tapes.
3. Miscellaneous glazing materials.

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.
- C. IBC: International Building Code.

1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- C. Delegated Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Certificates: For glass.
- C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain glass from single source from single manufacturer.
- B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

2.4 GLASS PRODUCTS (GL-1) – Reference Finish Legend on sheet A-140.

- A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
 - 1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
 - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
 - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing

materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks:
 - 1. EPDM or Silicone with Shore A durometer hardness of 85, plus or minus 5.
 - 2. Type recommended in writing by sealant or glass manufacturer.
- D. Spacers:
 - 1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
 - 2. Type recommended in writing by sealant or glass manufacturer.
- E. Edge Blocks:
 - 1. EPDM or Silicone with Shore A durometer hardness per manufacturer's written instructions.
 - 2. Type recommended in writing by sealant or glass manufacturer.

Retain "Cylindrical Glazing Sealant Backing" Paragraph below if applicable for glazing channels.

- F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide 1/8-inch- (3-mm-) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed extruded-aluminum louvers.

1.2 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

C. Samples: For each type of metal finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For manufacturer's special warranties.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 WARRANTY

- A. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.
- B. Structural Performance: Louvers withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures are considered to act normal to the face of the building.
 - 1. Wind Loads:
 - a. Determine loads based on a uniform pressure of 25 lbf/sq. ft. (1197 Pa), acting inward or outward.

- C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width in accordance with AMCA 500-L.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Drainable-Blade Louver, Extruded Aluminum:
 - 1. Manufacturer: Subject to compliance with requirements, provide fixed louver units by one of the following:
 - a. Carnes Company.
 - b. Greenheck Fan Corporation.
 - c. Ruskin.
 - 2. Louver Depth: 6 inches (150 mm).
 - 3. Frame and Blade Nominal Thickness: Not less than 0.080 inch (2.03 mm).
 - 4. Mullion Type: Exposed.
 - 5. Louver Performance Ratings:
 - a. Free Area: Not less than 9.41 sq. ft. (0.87 sq. m) for 48-inch- (1220-mm-) wide by 48-inch- (1220-mm-) high louver.
 - b. Point of Beginning Water Penetration: Not less than 1250 fpm (6.3 m/s).
 - c. Air Performance:
 - 1) Performance at 6,000 CFM (2.832 m3/s) Intake. Pressure Drop 0.061 in. wg (0.015kPa).
 - 6. Options and Accessories: Provide bird screen.
 - 7. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 MATERIALS

- A. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B209 (ASTM B209M), Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use Phillips flat-head, tamper-resistant screws for exposed fasteners unless otherwise indicated.
 2. For fastening aluminum, use aluminum or 300 series stainless steel fasteners.
 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless steel components, with allowable load or strength design capacities calculated in accordance with ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing in accordance with ASTM E488/E488M conducted by a qualified testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.5 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
 2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
1. Frame Type: Channel unless otherwise indicated.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
- F. Provide subsills made of same material as louvers.
- G. Join frame members to each other and to fixed louver blades with fillet welds as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.6 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

SECTION 090190.52 - MAINTENANCE REPAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes maintenance repainting as follows:

1. Removing existing paint.
2. Patching substrates.

1.2 DEFINITIONS

- A. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- B. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

1.3 SEQUENCING AND SCHEDULING

A. Perform maintenance repainting in the following sequence, which includes work specified in this and other Sections:

1. Dismantle existing surface-mounted objects and hardware except items indicated to remain in place. Tag items with location identification and protect.
2. Verify that temporary protections have been installed.
3. Examine condition of surfaces to be painted.
4. Remove existing paint to the degree required for each substrate and surface condition of existing paint.
5. Apply paint system.
6. Reinstall dismantled surface-mounted objects and hardware unless otherwise indicated.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for product application and use.
2. Include test data substantiating that products comply with requirements.

B. Samples: For each type of paint system and each pattern, color, and gloss; minimum 6 inches (150 mm) long in least dimension, but not less than whole pattern.

1. Include stepped Samples defining each separate coat, including fillers and primers. Resubmit until each required sheen, color, and texture is achieved.
2. Label each Sample for location and application.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra paint materials, from the same production run, that match products applied and that are packaged with protective covering for storage and identified with labels describing contents, including material, finish, source, and location on building.
 1. Quantity: Furnish Owner with an additional 7 percent, but not less than 1 gal. (3.8 L) or one case, as appropriate, of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Color Matching: Custom computer-match paint colors to colors indicated on Drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste daily.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with maintenance repainting only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.
- B. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

PART 2 - PRODUCTS

2.1 PREPARATORY CLEANING MATERIALS

- A. Water: Potable.
- B. Hot Water: Water heated to a temperature of 140 to 160 deg F (60 to 71 deg C).
- C. Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium pyrophosphate (TSPP), 1/2 cup (125 mL) of laundry detergent that contains no

ammonia, 5 quarts (5 L) of 5 percent sodium hypochlorite bleach, and 15 quarts (15 L) of warm water for every 5 gal. (20 L) of solution required.

- D. Mildewcide: Commercial proprietary mildewcide or a job-mixed solution prepared by mixing 1/3 cup (80 mL) of household detergent that contains no ammonia, 1 quart (1 L) of 5 percent sodium hypochlorite bleach, and 3 quarts (3 L) of warm water.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. Colors: As selected by Architect from full range of industry colors.

2.3 PAINT MATERIALS, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Transition Coat: Paint manufacturer's recommended coating for use where a residual existing coating is incompatible with the paint system.

2.4 PAINT MATERIAL MANUFACTURERS

- A. Sherwin-Williams Company
- B. Benjamin Moore & Co.
- C. Glidden Professional
- D. PPG Architectural Coatings

2.5 PAINT MATERIALS

A. Primers and Sealers:

1. Primer Sealer, Latex, Interior: MPI #50.
2. Primer, Latex, for Interior Wood: MPI #39.

B. Water-Based Paints:

1. Latex, Interior, (Gloss Level 3): MPI #52.
2. Latex, Interior, (Gloss Level 4): MPI #43.

2.6 PATCHING MATERIALS

- A. Wood-Patching Compound: Two-part, epoxy-resin, wood-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated from weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.
- B. Cementitious Patching Compounds: Cementitious patching compounds and repair materials specifically manufactured for filling cementitious substrates and for sanding or tooling prior to repainting; formulation as recommended in writing by manufacturer for type of cementitious substrate indicated, exposure to weather and traffic, the detail of work, and site conditions.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Comply with each manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
 1. Cover adjacent surfaces with materials that are proven to resist chemical solutions being used unless the solutions will not damage adjacent surfaces. Use protective materials that are UV resistant and waterproof. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
 2. Do not apply chemical solutions during winds of sufficient force to spread them to unprotected surfaces.
 3. Neutralize and collect alkaline and acid wastes before disposal.
 4. Dispose of runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.2 MAINTENANCE REPAINTING, GENERAL

- A. Maintenance Repainting Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from building interior at 10 feet (3 m) away from painted surface.

- B. Execution of the Work: In repainting surfaces, disturb them as minimally as possible and as follows:
 - 1. Remove failed coatings and corrosion and repaint.
 - 2. Verify that substrate surface conditions are suitable for repainting.
 - 3. Allow other trades to repair items in place before repainting.
- C. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use gentle methods, such as scraping and lightly hand sanding, that will not abrade softer substrates, reducing clarity of detail.
- D. Heat Processes: Do not use torches, heat guns, or heat plates.

3.3 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of painting work. Comply with paint manufacturer's written instructions for inspection.
- B. Maximum Moisture Content of Substrates: Do not begin application of coatings unless moisture content of exposed surface is below the maximum value recommended in writing by paint manufacturer and not greater than the following maximum values when measured with an electronic moisture meter appropriate to the substrate material:
 - 1. Concrete: 12 percent.
 - 2. Gypsum Board: 12 percent.
 - 3. Wood: 15 percent.
- C. Alkalinity: Do not begin application of coatings unless surface alkalinity is within range recommended in writing by paint manufacturer. Conduct alkali testing with litmus paper on exposed plaster, cementitious, and masonry surfaces.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
 - 1. If existing surfaces cannot be prepared to an acceptable condition for proper finishing by using specified surface-preparation methods, notify Architect in writing.
- E. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.4 PREPARATORY CLEANING

- A. General: Use the gentlest, appropriate method necessary to clean surfaces in preparation for painting. Clean all surfaces, corners, contours, and interstices.
- B. Detergent Cleaning: Wash surfaces by hand using clean rags, sponges, and bristle brushes. Scrub surface with detergent solution and bristle brush until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet. Rinse with water applied by clean rags or sponges.
- C. Solvent Cleaning: Use solvent cleaning to remove oil, grease, smoke, tar, and asphalt from painted or unpainted surfaces before other preparation work. Wipe surfaces with solvent using clean rags and sponges. If necessary, spot-solvent cleaning may be employed just prior to commencement of paint application, provided enough time is allowed for complete evaporation. Use clean solvent and clean rags for the final wash to ensure that all foreign materials have been removed. Do not use solvents, including primer thinner and turpentine, that leave residue.
- D. Mildew: Clean off existing mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. Rinse with water applied by clean rags or sponges.

3.5 PAINT REMOVAL

- A. General: Remove paint where indicated. Where cleaning methods have been attempted and further removal of the paint is required because of incompatible or unsatisfactory surfaces for repainting, remove paint to extent required by conditions.
 - 1. Application: Apply paint removers according to paint-remover manufacturer's written instructions. Do not allow paint removers to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.
 - a. Apply materials to all surfaces, corners, contours, and interstices, to provide a uniform final appearance without streaks.
 - b. After work is complete, remove protection no longer required. Remove tape and adhesive marks.
 - 2. Brushes: Use brushes that are resistant to chemicals being used.
 - a. Wood Substrates: Do not use wire brushes.
 - 3. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that spray methods do not damage surfaces.
 - a. Equip units with pressure gages.

- b. Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface and apply material in horizontal, back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.
 - c. For chemical spray application, use low-pressure tank or chemical pump suitable for chemical indicated, equipped with nozzle having a cone-shaped spray.
 - d. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
 - e. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.
- B. Paint Removal with Hand Tools: Remove paint manually using hand-held scrapers, wire brushes, sandpaper, and metallic wool as appropriate for the substrate material.
- C. Paint Removal with Alkaline Paste Paint Remover:
1. Remove loose and peeling paint using scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
 2. Apply paint remover to dry, painted surface with brushes.
 3. Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.
 4. Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.
 5. Repeat process if necessary to remove all paint.
- D. Paint Removal with Covered or Skin-Forming Alkaline Paint Remover:
1. Remove loose and peeling paint using scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
 2. Apply paint remover to dry, painted surface with brushes or as recommended in writing by manufacturer.
 3. Apply cover according to manufacturer's written instructions.
 4. Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.
 5. Scrape off paint and remover.
 6. Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.
 7. For spots of remaining paint, apply alkaline paste paint remover according to "Paint Removal with Alkaline Paste Paint Remover" Paragraph.
- E. Paint Removal with Solvent-Type Paste Paint Remover:
1. Remove loose and peeling paint using scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
 2. Apply thick coating of paint remover to dry, painted surface with natural-fiber cleaning brush, deep-nap roller, or large paintbrush. Apply in one or two coats according to manufacturer's written instructions.
 3. Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.

4. Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.
5. Repeat process if necessary to remove all paint.

F. Paint Removal with Covered, Solvent-Type Paste Paint Remover:

1. Remove loose and peeling paint using scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
2. Apply paint remover to dry, painted surface with natural-fiber cleaning brush, deep-nap roller, or large paint brush or as recommended in writing by manufacturer.
3. Apply cover according to manufacturer's written instructions.
4. Allow paint remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing.
5. Scrape off paint and remover.
6. Use mechanical methods recommended in writing by manufacturer to remove remaining chemicals and paint residue.

3.6 SUBSTRATE REPAIR

A. General: Repair substrate surface defects that are inconsistent with the surface appearance of adjacent materials and finishes.

B. Wood Substrate:

1. Repair wood defects including dents and gouges more than 1/8 inch (3 mm) in size and all holes and cracks by filling with wood-patching compound and sanding smooth. Reset or remove protruding fasteners.
2. Where existing paint is allowed to remain, sand irregular buildup of paint, runs, and sags to achieve a uniformly smooth surface.

C. Cementitious Material Substrate:

1. General: Repair defects including dents and chips more than 1/4 inch (6 mm) in size and all holes and cracks by filling with cementitious patching compound and sanding smooth. Remove protruding fasteners.
2. New and Bare Plaster: Neutralize surface of plaster with mild acid solution as recommended in writing by paint manufacturer. In lieu of acid neutralization, follow manufacturer's written instruction for primer or transition coat over alkaline plaster surfaces.
3. Concrete, Cement Plaster, and Other Cementitious Products: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. If surfaces are too alkaline to paint, correct this condition before painting.

D. Gypsum-Plaster and Gypsum-Board Substrates:

1. Repair defects including dents and chips more than 1/8 inch (3 mm) in size and all holes and cracks by filling with gypsum-plaster patching compound and sanding smooth. Remove protruding fasteners.

2. Rout out surface cracks to remove loose, unsound material; fill with patching compound and sand smooth.

3.7 PAINT APPLICATION, GENERAL

- A. Comply with manufacturers' written instructions for application methods unless otherwise indicated in this Section.
- B. Prepare surfaces to be painted according to the Surface-Preparation Schedule and with manufacturer's written instructions for each substrate condition.
- C. Apply a transition coat over incompatible existing coatings.
- D. Blending Painted Surfaces: When painting new substrates patched into existing surfaces or touching up missing or damaged finishes, apply coating system specified for the specific substrate. Apply final finish coat over entire surface from edge to edge and corner to corner.

3.8 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage paint-remover manufacturer's factory-authorized service representative for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.

3.9 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.10 INTERIOR MAINTENANCE REPAINTING SCHEDULE

- A. Wood Ceilings:
 1. Latex System over Latex Primer: MPI RIN 6.2D system over a transition coat.
 - a. Prime Coat: For MPI DSD 3 degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood, MPI #39.

- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Latex, interior, eggshell (Gloss Level 3), MPI #52.
- d. Color: Match colors indicated on Drawings.

B. Wood Moldings and Trim:

- 1. Latex System over Latex Primer: MPI RIN 6.3U system over a transition coat.
 - a. Prime Coat: For MPI DSD 3 degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood, MPI #39.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, eggshell (Gloss Level 3), MPI #52.
 - d. Color: Match colors indicated on Drawings.

END OF SECTION 090190.52

SECTION 090561 – COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
 - 1. Ceramic or Porcelain tile.
 - 2. Tile Carpeting.
 - 3. Resilient Tile Flooring.
- B. Removal of existing floor coverings.
- C. Preparation of existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and pH.

1.2 REFERENCES

- A. ASTM C109/C109M – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2012.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2009).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2011.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2011.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.4 SUBMITTALS

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and pH limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- C. Testing Agency's Report: Include:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and pH test reports:
 - a. Copies of specified test methods.
 - b. Recommendations for remediation of unsatisfactory surfaces.
 - c. Submit report to Owner.
 - d. Submit report not more than two business days after conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.
- E. Copy of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.

1.5 QUALITY ASSURANCE

- A. Moisture and pH testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
 - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
 - 1. Provide access for and cooperate with testing agency.
 - 2. Confirm date of start of testing at least 10-days prior to actual start.
 - 3. Allow at least 4-business days on site for testing agency activities.
 - 4. Achieve and maintain specified ambient conditions.

5. Notify Owner when specified ambient conditions have been achieved and when testing will start.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48-hours prior to testing, at not less than 65-degrees F (18-degrees C) or more than 85-degrees F (30-degrees C).
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48-hours prior to testing, at not less than 40-percent and not more than 60-percent.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 3. Compressive Strength: 3000-psi, minimum, after 28-days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, and suitable for adhesion of flooring without further treatment.
 1. Thickness: 1/8-inch (3-mm), maximum.
 2. If testing agency recommends any particular products, use one of those.

PART 3 - EXECUTION

3.1 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:

1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
2. Preliminary cleaning.
3. Moisture vapor emission tests: 3-tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
4. Internal relative humidity tests: in same locations as moisture vapor emission tests, unless otherwise indicated.
5. pH tests: in same locations as moisture vapor emission tests, unless otherwise indicated.
6. Specified remediation, if required.
7. Patching, smoothing, and leveling, as required.
8. Other preparation specified.
9. Adhesive bond and compatibility test.
10. Protection.

B. Remediations:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
3. Excessive pH: If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply skim coat of specified patching compound over entire suspect floor area.

3.2 REMOVAL OF EXISTING FLOOR COVERINGS

- A. Comply with local, State, and federal regulations and recommendations of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.3 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.4 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the reference test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3-pounds per 1000 square feet (1.4-kg per 93 square meters) per 24-hours.
- F. Report: Report the information required by the test method.

3.5 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75-percent relative humidity.
- F. Report: Report the information required by the test method.

3.6 PH TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Note: This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
- C. Use a wide range pH paper, its associated chart, and distilled or deionized water.
- D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1-inch (25-mm) in diameter. Allow the puddle to set for approximately 60-seconds, then dip the pH paper into the water, remove it, and compare immediately to the chart to determine pH reading.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value is over 10.

3.7 PREPARATION

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansive joints, isolation joints, or other moving joints.

3.8 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.9 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.10 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION 090561

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Framing Industry Association.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Notify manufacturer of damaged materials received prior to installation.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.
- C. Horizontal Deflection: For composite or non-composite wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft. (239 Pa).
- D. Design framing systems in accordance with AISI S220, "North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members," unless otherwise indicated.
- E. Design Loads: As indicated on architectural Drawings or 5 lbf/sq. ft. (239 Pa) minimum as required by the IBC.
- F. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with AISI S220 for conditions indicated.
 - 1. Steel Sheet Components: Comply with AISI S220 requirements for metal unless otherwise indicated
 - 2. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G40 (Z120); or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
 - a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.
- B. Studs and Track: AISI S220.
 - 1. CEMCO; California Expanded Metal Products Co.
 - 2. SCAFCO Steel Stud Company.
 - 3. Steel Construction Systems.
 - 4. MarinoWare.
 - 5. ClarkDietrich.
 - 6. Minimum Base-Steel Thickness: As indicated on Drawings and as required by performance requirements for horizontal deflection.
 - 7. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Double-Track System: ASTM C645 top outer tracks, inside track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. CEMCO; California Expanded Metal Products Co.
 - b. SCAFCO Steel Stud Company.
 - c. Steel Construction Systems.
 - d. Marino\Ware.
 - e. ClarkDietrich.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. CEMCO; California Expanded Metal Products Co.
 2. SCAFCO Steel Stud Company.
 3. Steel Construction Systems.
 4. Marino\Ware.
 5. ClarkDietrich.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. SCAFCO Steel Stud Company.
 2. Steel Construction Systems.
 3. ClarkDietrich.
 4. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. SCAFCO Steel Stud Company.
 2. Steel Construction Systems.
 3. ClarkDietrich.
 4. Depth: 1-1/2 inches.
 5. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C645.
1. SCAFCO Steel Stud Company.
 2. Steel Construction Systems.
 3. ClarkDietrich.
 4. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
 5. Depth: As indicated on Drawings.
- H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
1. SCAFCO Steel Stud Company.
 2. Steel Construction Systems.

3. ClarkDietrich.
 4. Configuration: Asymmetrical or hat shaped.
- I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 3/4 inch (19 mm).
 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
 3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, AC193, AC58 or AC308 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Type: Torque-controlled, expansion anchor, torque-controlled, adhesive anchor or adhesive anchor.
 - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 2-1/2 inches (64 mm).
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.

2. Steel Studs and Tracks: ASTM C645.
 - a. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
 - b. Depth: 1-5/8 inches (41 mm).
 3. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
 4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.
- G. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Armstrong Ceiling & Wall Solutions.
 2. USG Corporation.
 3. Cetainteed; SAINT-GOBAIN.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.

- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

Usually retain first subparagraph below. Design framing for doors more than 48 inches (1219 mm) wide, for double doors, and for extra-heavy doors to meet loading conditions.

- a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
- a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:
- a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches (1219 mm) o.c.
 - 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 - 3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 5. Do not attach hangers to steel roof deck.
 - 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

1.1 SUMMARY

- A. Section Includes:
1. Interior gypsum board.
 2. Tile backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Gypsum wallboard.
 2. Gypsum board, Type C.
 3. Cementitious backer units.
 4. Interior trim.
 5. Joint treatment materials.
 6. Laminating adhesive.
 7. Sound-attenuation blankets.
 8. Acoustical sealant.
- B. Samples: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
- C. Samples for Verification: For the following products:
1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
 2. become part of the completed Work if undisturbed at time of Substantial Completion.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
 1. American Gypsum.
 2. CertainTeed; SAINT-GOBAIN.
 3. PABCO Gypsum.
 4. USG Corporation.
 5. Gold Bond Building Products LLC Provided by National Gypsum Company.
 6. Thickness: 1/2 inch (12.7 mm).
 7. Long Edges: Tapered.

2.4 SPECIALTY GYPSUM BOARD

- A. Gypsum Board, Type C: ASTM C1396/C1396M. Manufactured to have increased fire-resistive capability.
 1. American Gypsum.
 2. CertainTeed; SAINT-GOBAIN.
 3. USG Corporation.
 4. Gold Bond Building Products LLC Provided by National Gypsum Company.
 5. Thickness: 1/2 inch (12.7 mm).
 6. Long Edges: Tapered.

2.5 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Certainteed; SAINT-GOBAIN.
 - b. James Hardie Building Products, Inc.
 - c. USG Corporation.
 - 2. Thickness: 1/2 inch (12.7 mm).
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.6 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.7 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.

4. Finish Coat: For third coat, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: Vertical surfaces unless otherwise indicated.
 - 2. Ceiling Type: Ceiling surfaces.
 - 3. Type C: Where required for specific fire-resistance-rated assembly indicated.
 - 4. Glass-Mat Interior Type: As needed at exterior wall assemblies.

- B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLATION OF TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

- B. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C840 and in specific locations approved by Architect for visual effect].
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners unless otherwise indicated.
 - 2. Bullnose Bead: Use where indicated.
 - 3. LC-Bead: Use at exposed panel edges.
 - 4. L-Bead: Use where required.
 - 5. U-Bead: Use at exposed panel edges.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Ceramic mosaic tile.
2. Porcelain tile.
3. Glazed wall tile.
4. Tile backing panels.
5. Waterproof membranes.
6. Crack isolation membranes.
7. Metal edge strips.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for cementitious back units and glass-mat, water-resistant backer board.

1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Face Size: Actual tile size, excluding spacer lugs.
- D. Module Size: Actual tile size plus joint width indicated.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Metal edge strips in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a Five-Star member of the National Tile Contractors Association.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs only Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained, and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 - 2. Obtain crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
 - 1. Crack isolation membrane.
 - 2. Cementitious backer units.
 - 3. Metal edge strips.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS – Reference Finish Legend on Sheet A-140.

A. Porcelain Tile Type – Single Use Restrooms Wall & Floor Tile (TL-3): Unglazed/Matte.

1. Subject to compliance with requirements, provide products by one of the following:
 - a. Basis-of-Design: Manufacturer: STONE PEAK CERAMICS INC., Pattern: URBAN 2.0, Color: LAVA GREY, Size: 12"x24".
 - b. Manufacturer: TILE BAR, Pattern: BASIC CEMENT, Color: GRIGIO
 - c. Manufacturer: ATLAS CONCORDE, Pattern: ELEMENT, Color: SILVER
 - d. Manufacturer: AMERICAN OLEAN, Pattern: THEORETICAL, Color: LOGICAL GRAY TH95
2. Install: Stacked.
3. Face Size: 12-inch (304.8 mm) x 24-inch (609.6 mm)
4. Face Size Variation: Rectified.
5. Thickness: As indicated.
6. Face: As indicated.
7. Dynamic Coefficient of Friction: Not less than 0.42.
8. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.
9. Grout Color: As selected by Architect from manufacturer's full range.
 - a. Base Cap: 6-inch (152.4 mm) x 24-inch (609.6 mm) field cut for wall base with metal edge trim cap.
 - b. Internal Corners: Field-buttet square corners.

B. Glazed Wall Tile Type – Break Room Wall Tile (TL-1):

1. Subject to compliance with requirements, provide products by one of the following:
 - a. Basis-of-Design: Manufacturer: ROCA TILE USA, Pattern: MAIOLICA, Color: WHITE, Size: 7x8 hexagon
 - b. Manufacturer: TILE BAR, Pattern: NEW ROCK, Color: PERLA WHITE, Size: 2" hex mosaic
 - c. Manufacturer: DALTILE, Pattern: REVALIA REMIX KALEIDOSCOPE MOSAIC, Color: WHITE RV16, Size: 6X6

2. Grout Color: As selected by Architect from manufacturer's full range.
3. Trim Units: As indicated on drawings.

C. Glazed Wall Tile Type – Multi-Stall Restroom Wall Tile (TL-2):

1. Subject to compliance with requirements, provide products by one of the following:
 - a. Basis-of-Design: Manufacturer: SONOMA TILEMAKERS, Pattern: MIRAZUR, Color: MIRO METALLIC, Shape: COPA (flattened diamond shape), Size: 2-3/4"x8-3/4", Install: vertically.
 - b. Manufacturer: SUNDERLANDS / JEFFREY COURT, Pattern: CHAPTER 12 – ASHLAND & HALSTED, Number: 12607, Color: WELDED , Size: 1" hexagon.
 - c. Manufacturer: VIRGINIA TILE / ATLAS CONCORDE, Pattern: BLAZE, Color: CORTEN MATTE, Size: 7"x8" ESAGONA MOSAIC, Number: ALBZCOESAGONA.
2. Grout Color: As selected by Architect from manufacturer's full range.
3. Trim Units: As indicated on drawings.

2.4 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. Georgia-Pacific Gypsum LLC.
 - c. USG Corporation.
 2. Thickness: 1/2 inch (12.7 mm).
- B. Fiber-Cement Backer Board: ASTM C1288, in maximum lengths available to minimize end-to-end butt joints.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Certainteed; SAINT-GOBAIN.
 - b. James Hardie Building Products, Inc.
 - c. USG Corporation.
 2. Thickness: 1/2 inch (12.7 mm).

2.5 CRACK ISOLATION MEMBRANES

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Crack Isolation Membrane, Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch (0.2-mm) nominal thickness.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Laticrete International, Inc.
 - b. MAPEI Corporation.
 - c. Schluter Systems L.P.
- C. Crack Isolation Membrane, Fluid-Applied: Liquid-latex rubber or elastomeric polymer.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik; Arkema.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.

2.6 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik; Arkema.
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation.
 - 2. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.4.
- B. Water-Cleanable, Tile-Setting Epoxy: Chemical resistant epoxy adhesive per ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide LATAPOXY 300 or comparable product by one of the following:
 - a. Bostik; Arkema.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.

d. MAPEI Corporation.

2.7 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High-Performance Tile Grout: ANSI A118.7.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik; Arkema.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
 2. Polymer Type:
 - a. Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 - b. Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.
- C. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik; Arkema.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F (60 and 100 deg C), respectively, and certified by manufacturer for intended use.

2.8 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 079200 "Joint Sealants."
1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

- B. Colors: Provide colors for approval by Architect of exposed sealants to match colors of grout in the tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; Dow Corning 786.
 - b. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
 - c. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
 - d. Percora Corporation; Percora 898 Sanitary Silicone Sealant.
 - e. Tremco Incorporated; Tremsil 600 White.

2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel exposed-edge material.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems L.P.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.

- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF CERAMIC TILE

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Grout joints to be 1/16" for tile smaller than 12"x12". Grout joints to be 1/8" for tile sizes larger than 12"x12". If mosaic, grout joints to match joints on pre-set sheets.
- H. Metal Edge Strips: Install at locations indicated.
- I. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 INSTALLATION OF CRACK ISOLATION MEMBRANES

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093013

SECTION 095123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles for interior ceilings.
 - 2. Fully concealed, direct-hung, suspension systems.
 - 3. Direct attachment of tiles to substrates with adhesive.
 - 4. Direct attachment of tiles to substrates with staples.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Tiles: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
 - 3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.
 - 4. Seismic Clips: Full size.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - 5. Size and location of initial access modules for acoustical tile.

6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
7. Show operation of hinged and sliding components adjacent to acoustical tiles.
8. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Acoustical Ceiling Units: Full-size tiles equal to **2** percent of quantity installed.
 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to **2** percent of quantity installed.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations:
1. Suspended Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.
 2. Directly Attached Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Class A according to ASTM E1264.
 2. Smoke-Developed Index: 50 or less.
- C. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL TILES (ACT-1) - Reference Finish Legend on Sheet A-140.

- A. Basis of Design: As indicated in drawings, or subject to compliance with requirements, provide products by one of the following:
1. Armstrong World Industries, Inc.
 2. Certainteed; SAINT-GOBAIN.
 3. USG Corporation.
- B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide tiles as follows:
1. Type and Form: Type IV, mineral base with painted finish; Form: 2.
 2. Pattern: E (lightly textured).
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.75.
- F. Ceiling Attenuation Class (CAC): Not less than 33 CAC.
- G. Noise Reduction Coefficient (NRC): Not less than 0.60.

- H. Edge/Joint Detail: As indicated in drawings.
- I. Thickness: 5/8 inch (15 mm).
- J. Modular Size: As indicated on Drawings.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM – Reference Finish Legend on sheet A-140.

- A. Basis of Design: As indicated in drawings, or subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong Ceiling & Wall Solutions.
 - 2. Certainteed; SAINT-GOBAIN.
 - 3. USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, fully concealed, metal suspension system and accessories of type, structural classification, and finish indicated that complies with applicable requirements in ASTM C635/C635M.
 - 1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C635/C635M.
- C. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, pre-painted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation.
 - 1. Structural Classification: Heavy-duty system.
 - 2. Access: Upward and end pivoted or side pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.
 - a. Initial Access Opening: In each module, 24 by 24 inches (610 by 610 mm).

2.5 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
 - 2. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.

3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- (3.5-mm-) diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
 - D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
 - E. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
 - F. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
 - G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.
 - H. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical tiles in-place during a seismic event.
- 2.6 ACOUSTICAL SEALANT
- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."
- 2.7 MISCELLANEOUS MATERIALS
- A. Acoustical Tile Adhesive: Type recommended in writing by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.
 - B. Staples: 5/16-inch- (8-mm-) long, divergent-point staples.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Testing Substrates: Before adhesively bonding tiles to wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- C. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 8. Do not attach hangers to steel deck tabs.
 - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Arrange directionally patterned acoustical tiles as follows:
 1. As indicated on reflected ceiling plans.
- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges of tiles so tile-to-tile joints are interlocked.
 1. Fit adjoining tiles to form flush, tight joints. Scribe and cut tiles for accurate fit at borders and around penetrations through ceiling.
 2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tiles and moldings, spaced 12 inches (305 mm) o.c.
 3. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
 1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Perform the following tests and inspections of completed installations of acoustical tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.
 - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
 - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical tile ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096363 - TERRAZZO CLEANING

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. BASE BID: General Contractor shall provide all material and labor to:
 - 1. Strip, clean and seal existing terrazzo floors.

1.2 RELATED WORK

- A. Section 096400 -Terrazzo Repair

1.3 SUBMITTALS

- A. Procedures: Furnish submittals in accordance with general requirements specified in Section 01 33 00 - Shop Drawings, Product Data and Samples. All submittals shall be made to the Architect.
- B. Submit four (4) copies of the following for approval: Complete data describing all materials and methods proposed for use in the repair work. This shall include manufacturer's written specifications and other data for each type of repair material, accessory, and other manufactured products, including certifications that each type complies with specified requirements and material safety data sheets. Include instructions for handling, storage, installation and protection.
- C. **Mock-up:** The Provide specified mock-up samples at a location on site to be designated by Architect. Utilize the same craftsmen, materials and installation methods in the mock-up as intended for the final Work. Schedule the installation so that the mock-up may be examined, and any necessary adjustments made, prior to commencing fabrication of the Work. Replace unsatisfactory item as directed. When accepted, mock-up shall become part of the Work and serve as the standard for materials, workmanship, and appearance for such Work throughout the project.
 - 1. The Contractor shall clean sample panels 1'-0" by 1'-0" in area, on each color and type of terrazzo for approval by the Architect. Locations of sample panels to be selected by the Architect.
 - 2. Sample panels for cleaning shall be prepared for approval and shall establish a standard for all terrazzo stripping and refinishing work. No work shall commence until written approval for the control samples has been obtained from the Architect.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:

1. Comply with municipal and federal regulations governing all aspects of the work included in this section.
 2. Where current codes cannot be complied with, and/or construction limitations (including deterioration of existing substrate) are such that the intended finish cannot be achieved, notify the Architect for clarification and/or decision prior to proceeding with the work.
- B. The Contractor for this work shall have at least ten (10) years' experience with similar historic terrazzo cleaning on historic buildings and shall submit a list of at least five similar complete projects to the Architect at the time of bidding including a name of a person (Using Agency, Manager, etc.) who may be contacted for information concerning said projects. The Architect reserves the right to approve or disapprove the use of the personnel contingent upon their experience.
1. Contractor's superintendent and foreman assigned to this project shall each have a minimum of ten (10) years' experience with this type of cleaning work. The project superintendent and foreman assigned to this project shall not be changed throughout the duration of the work without written consent of the Architect and University.
 2. Installer qualifications: Employ only workers experienced in cleaning historic terrazzo with a minimum of five (5) years project experience and provide written and photographic documentation of restoration skills.
- C. **Pre-installation Conference:** Coordinating Contractor shall arrange conference at project site. Coordinating contractor, installation contractor project manager and site foreman, and Architect shall be in attendance. If the work impacts other trades, a representative from those contractors shall also be in attendance.

1.5 EXISTING CONDITIONS:

- C. The existing terrazzo has a great deal of sealer, wax and dirt build up.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Terrazzo Cleaner: Liquid, neutral chemical cleaner, with Ph factor between 7 or 10 of formulation recommended by sealer manufacturer for type of terrazzo used and complying with NTMA requirements.
1. Terroxy Stripper by Terrazzo & Marble (T&M) Supply.
 2. Similar / equal product by 3-M.
 3. Similar / equal product by Hillyard.

- B. Terrazzo Cleaner for vertical surfaces:
 - 1. Quick & Clean Jell Baseboard Stripper by Hillyard.
 - 2. Similar / equal product by 3-M.
 - 3. Similar / equal product by Terroxy.
- C. Terrazzo Cleaning Agent Neutralizer & Liquid Finish Remover:
 - 1. Trouble Shooter Liquid Finish Remover by 3-M.
 - 2. Similar / equal product by Terroxy.
 - 3. Similar / equal product by Hillyard.
- D. Restorative Type diamond grind/polishing pads approved for use on terrazzo:
 - 1. Scotch-Brite by 3-M.
 - 2. Similar / equal product by Terroxy.
 - 3. Similar / equal product by Hillyard.
- E. Terrazzo Cleaner after grinding/ polishing
 - 1. Neutral Clenaer Concentrate by 3-M.
 - 2. Similar / equal product by Terroxy.
 - 3. Similar / equal product by Hillyard.
- F. Terrazzo Interior Floor Sealer: Colorless, slip and stain resistant penetrating sealer with Ph factor between 7 and 10 that does not affect color or physical properties of terrazzo surface.
- G. Water: Potable, non-staining and free of oils, acids, alkalis and organic matter.

2.2 EQUIPMENT

- A. Wet vacuum
- B. Paint roller, brushes, and mops
- C. Low pressure tank sprayer
- D. Power scrubber with scrub brush attachment
- E. Stainless steel trowel
- F. Wood scrapers
- G. Stiff bristle brushes (non-ferrous bristle)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Perform a thorough examination of the existing terrazzo conditions. Per-

form any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for stripping terrazzo surfaces.

3.2 PREPARATION

A. Protection:

1. Take all necessary precautions and measures to protect all surrounding materials from damage that might be incurred during the terrazzo restoration work. Any damage caused by the General Contractor to other materials is unacceptable and shall be repaired or replaced by the General Contractor to the satisfaction of the Architect, at no cost to the Using Agency.
2. Improper use of chemicals may constitute a health hazard. Refer to manufacturer's Material Safety Data Sheets for hazard data, special protection, for use and precautions to be taken in handling and storage. Comply with manufacturer's recommendations for proper use of chemicals.

3.3 APPLICATION

A. Strip built-up floor coatings from the terrazzo flooring:

1. Applying approved stripper with paint roller or other manufacturer approved method.
2. Allow to dwell per manufacturer's recommendations.
3. Pick up solution with wet vacuum or auto scrubber.

B. Strip built-up coatings from vertical surfaces:

1. Apply to surface and allow to dwell one to five minutes. Scrub with sponge or pad
2. Wipe area clean with damp cloth

C. Apply neutralizing rinse.

D. Install all patch material and crack repair according to Section 09 64 00 -Terrazzo Repair

E. Grind/ Polish existing terrazzo surface with restorative type diamond pads.

F. Clean terrazzo surfaces thoroughly with approved cleaner

G. Rinse floor and allow to dry

H. Apply water-based sealer over terrazzo and allow to dry

END OF SECTION 096363

SECTION 096400 – TERRAZZO REPAIR

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Contractor shall provide all labor and materials to repair existing terrazzo in Main Building Entry Lobby and all multi-stall Men's & Women's restrooms, including:
 - 1. Patch crack by injection at terrazzo surfaces.
 - 2. Patch / fill voids at terrazzo surfaces.

1.2 RELATED WORK

- A. Section 096363 – Terrazzo Cleaning

1.3 REFERENCES

- 1. NTMA Standards: comply with specified provisions and recommendations of the National Terrazzo and Mosaic Association, Inc. (NTMA), 3166 Des Plaines Avenue, Suite 132, Des Plaines, IL 60018, 800-323-9736 or 708-635-7744. Fax 708-635-9127.

1.4 SUBMITTALS

- A. Procedures: Furnish submittals in accordance with the general requirements specified in Section 01 33 00 – Shop Drawings, Product Data and Samples. All submittals shall be made to the Architect and FMDC.
- B. Submit complete data describing all materials and methods proposed for use in the repair work. This shall include manufacturer's written specifications and other data for each type of repair material, accessory, and other manufactured products, including certifications that each type complies with specified requirements and material data safety data sheets. Include instructions for handling, storage, installation, and protection.
- C. Mock-up: Provide specified mock-up samples at a location on site to be designated by FMDC. Utilize the same craftsmen, materials, and installation methods in the mock-up as intended for the final Work. Schedule the installation prior to commencing fabrication of the Work. Replace unsatisfactory item as directed. When accepted, mock-up shall become part of the Work and serve as the standard for materials, workmanship, and appearance for such Work throughout the project.
 - 1. Provide one sample of each repair method prior to installation. Samples to be approved by Architect and FMDC prior to installation.
 - 2. Provide one sample for each color to be used at patched areas. Samples to be approved prior mock-up repair of existing terrazzo.

1.5 QUALITY ASSURANCE

- A. Workers Qualifications: The work shall be performed by personnel possessing a minimum of ten (10) years of specialized experience in the restoration and repair historic architectural terrazzo, similar to that which is required in this project. The successful Contractor shall submit to Architect and FMDC reference of previous work, documenting the firm's experience. FMDC reserves the right to approve or disapprove of the use of the personnel contingent upon their experience.
 - 1. Note: The quality of the work is highly dependent on the competence of the personnel because it is not possible to anticipate every variation encountered in the surfaces, job conditions, and methods used. Therefore, highly qualified personnel are mandatory.
- B. Pre-Installation Conference: Coordinating Contractor shall arrange conference at project site. Coordinating contractor, installation contractor, project manager, and site foreman, and FMDC shall be in attendance. If the work impacts other trades, a representative from those contractors shall also be in attendance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type 1, except as modified to comply with NTMA requirements for compressive strength. Obtain cement from a single source for each required color.
 - 1. Provide non-staining white cement for terrazzo matrix.
- B. Sand: ASTM C33
- C. Clean potable water.
- D. Terrazzo Components Aggregate: Natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements.
 - 1. Colors and gradation of aggregate sizes to match original existing intact materials. Match marble chips and matrix for existing terrazzo by size, mineral content and color. Colors should be matched after cleaning.
 - 2. Matrix Pigments: Pure mineral or synthetic pigments, resistant to alkalis and non-fading. Mix pigments with matrix to provide required colors.
 - 3. Curing Compound: Liquid membrane forming compound, ASTM C309, Type 1.
 - 4. Grout: A cement acrylic grout with color added to match the matrix of the original terrazzo.

2.2 EQUIPMENT FOR TERRAZZO WORK

- A. Grinding Stones: Fine grit diamond grid pads manufactured specifically for restorative type grinding and surfacing / polishing of terrazzo surfaces (#40 and #80 grit stones).

- B. Power saw and hand tools.
- C. Resurfacing Screens: A fine grit screen manufactured specifically for restorative type grinding and resurfacing terrazzo surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General Surface Preparation:
 - 1. Clean surface of debris. Saturate void with water to prevent quick surface drying. Ensure that water penetrates into the surface in order to achieve a proper bond. Clean surfaces until any obstructing material has been removed.

3.2 SUGGESTED REPAIR PROCEDURES

- A. The following descriptions of terrazzo rehabilitation are for the purpose of defining the scope and general description of the Work to be performed. Where applicable the manufacturer's printed literature and specifications shall be followed at all times while performing the Work.

3.3 REPAIR PROCEDURE – TERRAZZO CRACK REPAIR

- A. Surface Preparation:
 - 1. With a power saw or hand tools, cut a joint along the path of the crack. All surfaces shall be 90 degrees to each other and the depth of the joint shall be not less than 5/8".
 - 2. Apply cement paste and work into the surface. Do not allow cement paste to dry before placing terrazzo composition.
- B. Mix two parts blended marble chips with one part Portland Cement and add enough water to make this mix plastic.
- C. Place mixture over crack and level with a trowel.
- D. Seed additional marble chips of the same blend over the patch, to establish a uniform coverage.
- E. Compact patch, removing all excess water and cement from the surface.
- F. Cover the patch with paper or polyethylene sheeting to prevent quick dehydration. Cure until topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding.
- G. Sand surface with a hand sander or small grinding tool, using fine stones to achieve finish to match adjacent existing finish.

1. Use a #40 or finer grit stone for the initial grinding, exposing the marble chips. Follow with a fine #80 grit stone before grouting with cement to fill all pinholes.
2. Cover grouted surface with paper or polyethylene for at least 72 hours.
3. Thoroughly rinse the surface with clean water.
4. Remove excess rinse water and machine or hand apply grout using identical Portland cement, color and pigments as used in topping taking care to fill all voids completely.
5. Final polish with #80 or finer grit stone. Care should be taken to limit grinding and polishing to a small distance beyond the perimeter of the patch.

H. Seal patch with a penetrating type terrazzo sealer included in 096363.

3.4 REPAIR PROCEDURE – TERRAZZO PATCH REPAIR AND INFILL OF TERRAZZO SURFACE

A. Surface Preparation:

1. With a power saw or hand tools, cut a vertical perimeter wall around the area to be patched. If the patch is smaller than an inch square, slightly undercut this edge.
2. Apply cement paste and work into the surface. Do not allow cement paste to dry before placing terrazzo composition.

B. Mix two parts blended marble chips with one part Portland Cement and add enough water to make this mix plastic.

C. Place mixture over patch area and level with a trowel.

D. Seed additional marble chips of the same blend over the patch, to establish a uniform coverage.

E. Compact patch, removing all excess water and cement from the surface.

F. Cover patch with paper or polyethylene sheeting to prevent quick dehydration. Cure until topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding.

G. Sand surface with a hand sander or smaller grinding tool, using fine stones to achieve desired finish.

1. Use a #40 or finer grit stone for the initial grinding, exposing the marble chips. Follow with a fine #80 grit stone before grouting with cement to fill all pinholes. CAUTION: Divider strips may be coated instead of solid composition. Coated strips should be ground. Grinding may cause coated divider strips to lose their coating and discolor. Test a small area prior to repair work.
2. Cover grouted surface with paper or polyethylene for at least 72 hours/
3. Thoroughly rinse the surface with clean water.
4. Remove excess rinse water and machine or hand apply grout using identical Portland cement, color and pigments as used in topping taking care to fill all voids completely.

5. Grinding and polishing to a small distance beyond the perimeter of the patch.

H. Seal patches with a penetrating type terrazzo sealer included in 096363 Terrazzo Cleaning.

3.5 CLEANING

A. Upon completion of the Work specified herein, clean up and dispose off site all debris and unused materials.

B. Repair any damage incurred under this Contract to its previous condition and leave all areas in clean and tidy condition.

END OF SECTION 096400

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl base.
 - 2. Vinyl molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
- C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.
- D. Samples for Initial Selection: For each type of product indicated.
- E. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.
- F. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL BASE (WB-1) – Reference Finish Legend on sheet A-140.

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation.
- B. Product Standard: ASTM F1861, Type TV (vinyl, thermoplastic).
 - 1. Group: I (solid, homogeneous) or II (layered).
 - 2. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.
- C. Minimum Thickness: 0.125 inch (3.2 mm).

- D. Height: 4 inches (102 mm).
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors and Patterns: As indicated on drawings.

2.2 VINYL MOLDING ACCESSORY – Reference sheet A-502.

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation.
- B. Description: Vinyl nosing for carpet, reducer strip for resilient floor covering, or transition strips.
- C. Profile and Dimensions: As indicated on drawings.
- D. Locations: Provide vinyl molding accessories in areas indicated.
- E. Colors and Patterns: As indicated on drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 2. Tightly adhere to substrates throughout length of each piece.
 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
1. Remove adhesive and other blemishes from surfaces.
 2. Sweep and vacuum horizontal surfaces thoroughly.
 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

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. Luxury Vinyl Tile

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient floor tile.
 - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- C. Samples: Full-size units of each color, texture, and pattern of floor tile required.
 - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.
- D. Samples for Initial Selection: For each type of floor tile indicated.
- E. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- F. Product Schedule: For floor tile.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 LUXURY VINYL TILE (LVT-1) – Reference Finish Legend on sheet A-140.

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of Design: Manufacturer: SHAW CONTRACT, Pattern: SOLITUDE 0648V, Color: SMOKE 48506, Size: 6"x48"
 - 2. Manufacturer: MILLIKEN, Collection: THE MAGIC HOUR, Pattern: HORIZON, Color: HZN144 EXPOSURE, Size: 10"x59"
 - 3. Manufacturer: MOHAWK GROUP, Pattern: LARGE & LOCAL C0128, Color: 978 WOODY, Size: 9.25"X59"
- B. Tile Standard: ASTM F1700.
 - 1. Class: Class III, Printed Film Vinyl Tile.
 - 2. Type: B, Embossed Surface.
- C. Wear Layer Thickness: minimum 20 mil (0.02 inches) (0.51 mm).
- D. Thickness: 0.197 inches (5 mm) preferred; 4.5 mm minimum
- E. Edge Profile: Squared Edge.
- F. Install: Ashlar
- G. Colors and Patterns: As indicated on drawings.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
1. Lay tiles in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, cabinets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
1. Remove adhesive and other blemishes from surfaces.
 2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 - D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Modular carpet tile.

- B. Related Requirements:

- 1. Section 024119 "Selective Demolition" for removing existing floor coverings.
- 2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 ACTION SUBMITTALS

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

- 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- 2. Include manufacturer's written installation recommendations for each type of substrate.

- B. Shop Drawings: For carpet tile installation, plans showing the following:

- 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
- 2. Carpet tile type, color, and dye lot.
- 3. Type of subfloor.
- 4. Type of installation.
- 5. Pattern of installation.
- 6. Pattern type, location, and direction.
- 7. Type, color, and location of edge, transition, and other accessory strips.
- 8. Transition details to other flooring materials.

- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
 2. Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- D. Samples for Initial Selection: For each type of carpet tile.
1. Include Samples of transition, and other accessory stripping involving color or finish selection.
- E. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet Tile: Full-size Sample.
 2. Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- F. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- G. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
 - B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
 - C. Product and Installation Warranty.
- 1.5 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- 1.6 MAINTENANCE MATERIAL SUBMITTALS
- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Carpet Tile: Full-size units equal to 10 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104.

1.9 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

- A. 10 Year Commercial Wear Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CPT-1) & (CPT-2) – Reference Finish Legend on sheet A-140.

- A. Basis of Design: As indicated on drawings, or Subject to compliance with requirements, provide products by one of the following:
 - 1. Interface, Inc.
 - 2. Milliken & Company.
 - 3. Mohawk Carpet, LLC; The Mohawk Group.
 - 4. Shaw Industries Group, Inc.; Berkshire Hathaway Company.
- B. Color: CPT-1 – Angora #79596; CPT-2 – Iron #104940
- C. Pattern: CPT-1 – Check Tile #5T281; CPT-2 – Step Repeat #SR899
- D. Fiber Content / Type (minimum): Commercial BCF 100% Nylon type 6 or 6,6.
- E. Dye Method: Solution or yarn dyed.
- F. Pile Characteristic (minimum): Loop / Tufted loop / Multi-level loop / tip shear with lifetime warranty against fray, edge ravel, zippering, and delamination.
- G. Density: 5,500 oz. or greater per cubic yard.
- H. Stitches: Minimum 9.0 per inch.
- I. Gage: Minimum 1/10 inch (2.54 mm).
- J. Face / Yarn Weight: 18 oz minimum.
- K. Primary Backing/Backcoating: Manufacturer's standard composite materials.
- L. Secondary Backing: Manufacturer's standard material.
- M. Backing System: Synthetic.
- N. Size: 4 inch to 24 inch by 36 inch to 48 inch (plank) or 15 inch to 24 inch by 15 inch to 24 inch (square).
- O. Applied Treatments:
 - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
- P. Performance Characteristics:
 - 1. Appearance Retention Rating: Moderate traffic, 2.5 minimum according to ASTM D7330.
 - 2. Flammability: Pass pill test, ASTM D-2859.

3. Critical Radiant Flux Classification: Class I: Not less than 0.45 W/sq. cm according to NFPA 253.
4. NBS Smoke Density: (NFPA-258), less than 450.
5. Toxicity: Carpet tile should be approved by the Carpet and Rug Institute's Indoor Air Quality Testing Program.
6. Dry Breaking Strength: Not less than 100 lbf (445 N) according to ASTM D2646.
7. Tuft Bind: Not less than 10 lbf (45 N) according to ASTM D1335.
8. Delamination: Not less than 3.5 lbf/in. (0.6 N/mm) according to ASTM D3936.
9. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
10. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
11. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
12. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
13. Electrostatic Propensity: S/B AATCC 134, less than 3.5 kV according to AATCC 134.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Solvent-free, water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Edge/Transition Strips: Stainless steel with **mill** finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.
 1. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than 1/8 inch (3 mm), protrusions more than 1/32 inch (0.8 mm), and substances that may interfere with adhesive bond or show through surface.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Exposed edges are unacceptable.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 097200 – PREFINISHED GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 061000, Rough Carpentry.
 - 2. Section 092900, Gypsum Board.
 - 3. Section 102219, Demountable Partitions.

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl wall covering.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. C 954, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.33 inches (0.84 mm) to 0.112 inches (2.84 mm) in thickness.
 - 2. C 1002, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
 - 3. C 1396, Specification for Gypsum Board.
 - 4. E 84, Test Method for Surface Burning Characteristics of Building Materials.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide UL listed materials with fire hazard classification of wall panel, as determined by ASTM E 84, as follows:
 - 1. Flame spread no more than 25.
 - 2. Smoke developed of not more than 50.

1.5 ACTION SUBMITTALS

- A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

- B. Samples: Min. 2 inch (50 mm) by 5 inch (127 mm) samples that match existing conditions.
- C. Contract Closeout Submittals:
 - 1. Operation and Maintenance Data: Manufacturer's cleaning recommendations for each product specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging and Shipping: Have materials shipped in manufacturer's original packages showing manufacturer's name and product brand name.
- B. Storage and Protection: Store materials inside and protected from damage by the elements. Protect ends, edges, and faces of gypsum wall panels from damage.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Store adhesive at 70 degrees F for a minimum of 24 hours before application and maintain an ambient temperature during application between 55 degrees F and 70 degrees F.

1.8 MAINTENANCE

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Gold Bond Building Products, LLC provided by National Gypsum Company, or subject to compliance with requirements.
 - 1. Gypsum Board:
 - a. Regular Prefinished Board: Gold Bond 1/2 inch Durasan Prefinished Gypsum Board.
 - b. Fire-Rated Prefinished Board: Gold Bond 5/8 inch Durasan Prefinished Gypsum Board.
 - 2. Panel Covering: Vinyl
 - 3. Accessories:
 - a. Trim: Matching Trim, One Piece (vinyl).
 - b. Clips: Edge Grip Clips.
 - c. Adhesive: Ready Mix Joint Compound.

2.2 MATERIALS

A. Gypsum Board:

1. Prefinished Gypsum Board: Gypsum core wall panel surfaces on front and long edges with vinyl and complying with ASTM C 1396.
 - a. Thickness: 1/2 inch (12.7 mm).
 - b. Width: 48 inches (1219 mm).
 - c. Length: 96 inches (2438 mm) through 168 inches (4267 mm).
 - d. Edges: Beveled.
2. Fire-Rated Prefinished Gypsum Board: A gypsum core wall panel with additives to enhance fire resistance of the core and surface with vinyl on front and long edges and complying with ASTM C 1396, Type X.
 - a. Thickness: 5/8 inch (16 mm).
 - b. Width: 48 inches (1219 mm).
 - c. Length: 96 inches (2438 mm) through 168 inches (4267 mm).
 - d. Edges: Beveled.

B. Panel Covering:

1. Vinyl Film: Vinyl film without backing.
 - a. Thickness: 0.004 inches (0.1016 mm) and 0.006 inches (0.1524 mm).
 - b. Pattern: Harvest Collection.
 - c. Color: Oyster White.

C. Accessories

1. Trim: Galvanized steel retainer and matching vinyl snap-on facing.
 - a. Outside Corner: 1-5/8 inches (41.275 mm) by 1-5/8 inches (41.275 mm).
 - b. Interior (Batten): 1 inch (25.4 mm) face.
2. Clips: Stamped and formed steel clip, Edge Grip Clips.
3. Screws: ASTM C 954 or ASTM C 1002 or both with threads, points, and finish as recommended by the manufacturer.
4. Adhesive: Drying type pre-mixed compound.
5. Adhesive: Setting type job mixed chemical-hardening compound.
6. Nails: Painted stainless steel with a shank diameter of 0.145 inches (3.683 mm).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. In accordance with manufacturer's recommendations.

3.2 PROTECTION

- A. Protect prefinished gypsum wall panel installations from damage and deterioration until the date of Substantial Completion.

END OF SECTION 097200

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Primers.
 - 2. Water-based finish coatings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include preparation requirements and application instructions.
 - 2. Indicate VOC content.
- B. Samples: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint Products: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN – As indicated on drawings, or subject to compliance with requirements provide product by one of the following:

- A. Sherwin Williams Company.
- B. Benjamin Moore & Co.
- C. Glidden Professional.
- D. PPG Architectural Coatings.
- E. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As indicated in a color schedule.

1. Ten percent of surface area will be painted with deep tones.

2.3 PRIMERS

- A. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.
 1. Sherwin Williams Company.
 2. Benjamin Moore & Co.
 3. Glidden Professional.
 4. PPG Architectural Coatings.
- B. Interior Latex Primer for Wood: Waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on interior wood subject to extractive bleeding.
 1. Sherwin Williams Company.
 2. Benjamin Moore & Co.
 3. Glidden Professional.
 4. PPG Architectural Coatings.
- C. Interior Oil-Based Primer: Sealer and stain blocker used on wood, hardboard, cured plaster, paneling, ceiling tiles, and previously painted surfaces.
 1. Sherwin Williams Company.
 2. Benjamin Moore & Co.
 3. Glidden Professional.
 4. PPG Architectural Coatings.

2.4 WATER-BASED FINISH COATS

- A. Interior, Latex, Eggshell: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
 1. Sherwin Williams Company.
 2. Benjamin Moore & Co.
 3. Glidden Professional.

4. PPG Architectural Coatings.
 5. Gloss and Sheen Level: Manufacturer's standard eggshell finish; Gloss of 10 to 25 units at 60 degrees and sheen of 10 to 35 units at 85 degrees when tested in accordance with ASTM D523.
- B. Interior, Latex, Satin: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.
1. Sherwin Williams Company.
 2. Benjamin Moore & Co.
 3. Glidden Professional.
 4. PPG Architectural Coatings.
 5. Gloss and Sheen Level: Manufacturer's standard low-sheen finish; Gloss of 20 to 35 units at 60 degrees and minimum sheen of 35 units at 85 degrees when tested in accordance with ASTM D523.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Wood: 15 percent.
 2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
 - 4. Collect waste paint by type and deliver to recycling or collection facility.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Finish Carpentry: Wood trim.

- 1. Latex over Latex Primer System:

- a. Prime Coat: Interior latex primer for wood.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.

- B. Gypsum Board Substrates:

- 1. Latex over Latex Sealer System:

- a. Prime Coat: Interior latex primer sealer.
 - b. Intermediate Coat: Matching topcoat.
 - c. Topcoat: Interior, latex, eggshell.

END OF SECTION 099123

SECTION 102113.13 - METAL TOILET COMPARTMENTS

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. Painted steel toilet compartments configured as toilet enclosures.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports that attach floor-and-ceiling-anchored compartments and post-to-ceiling screens to overhead structural system.

1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

- B. Shop Drawings: For toilet compartments.

- 1. Include plans, elevations, sections, and attachment details.
 - 2. Show locations of reinforcements for compartment-mounted grab bars and locations of blocking for surface-mounted toilet accessories.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show locations of floor drains.
 - 5. Show overhead support or bracing locations.

- C. Samples for Initial Selection: For each type of toilet compartment material indicated.

- 1. Include Samples of hardware and accessories involving material and color selection.

- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Door Hinges: Four (4) hinge(s) with associated fasteners.
 2. Latch and Keeper: Two (2) latch(es) and keeper(s) with associated fasteners.
 3. Door Bumper: Two (2) door bumper(s) with associated fasteners.
 4. Door Pull: Two (2) door pull(s) with associated fasteners.
 5. Fasteners: Ten (10) fasteners of each size and type.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with applicable provisions in ICC A117.1 for toilet compartments designated as accessible.

2.2 PAINTED STEEL TOILET COMPARTMENTS (TLP-1) – Reference Finish Legend on sheet A-140.

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. ASI Accurate Partitions.

2. ASI Global Partitions.
 3. Bradley Corporation.
 4. Hadrian Inc.; Zurn Industries, LLC.
- B. Toilet-Enclosure Style: Floor anchored.
- C. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Provide with no-sightline system. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.
 2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand applied downward load on grab bar of at least 250 lbf (1112 N), when tested according to ASTM F446, without deformation of panel.
 3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
- D. Facing Sheets and Closures: Electrolytically coated steel or hot-dip galvanized-steel sheet with nominal base-metal (uncoated) thicknesses as follows:
1. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 1-1/4 inch (31.75 mm).
 2. Panels: Manufacturer's standard thickness, but not less than 1 inch (25.4 mm).
 3. Doors: Manufacturer's standard thickness, but not less than 1 inch (25.4 mm).
- E. Pilaster Shoes and Sleeves (Caps): Stainless steel sheet, not less than 1-1/4 inch (31.75 mm) nominal thickness and 3 inches (76 mm) high, finished to match hardware.
- F. Brackets (Fittings):
1. Stirrup Type: Ear or U-brackets; chrome-plated die cast zamac.
 2. Full-Height (Continuous) Type: Manufacturer's standard design; heavy duty anodized extruded aluminum.
- G. Steel Sheet Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on finish, including thermosetting, electrostatically applied, and powder coatings. Comply with coating manufacturer's written instructions for applying and baking.
1. Basis of Design: As indicated on drawings, or subject to compliance with requirements.
 2. Color: As selected by Architect from manufacturer's full range.

- a. Allow for application of one color in each room.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.
 1. Hinges: Manufacturer's minimum 0.062-inch- (1.59-mm-) thick, stainless steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
 2. Latch and Keeper: Manufacturer's heavy-duty, surface-mounted, cast stainless steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
 3. Coat Hook: Manufacturer's heavy-duty, combination cast stainless steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
 4. Door Bumper: Manufacturer's heavy-duty, rubber-tipped, cast stainless steel bumper at out-swinging doors. Mount with through-bolts.
 5. Door Pull: Manufacturer's heavy-duty cast stainless steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M).
- C. Brass Castings: ASTM B584.
- D. Brass Extrusions: ASTM B455.
- E. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
 1. Electrolytically Zinc Coated: ASTM A879/A879M, 01Z (03G).

2. Hot-Dip Galvanized: ASTM A653/A653M, either hot-dip galvanized or galvanized.
- F. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- G. Stainless Steel Castings: ASTM A743/A743M.
- H. Zamac: ASTM B86, commercial zinc-alloy die castings, chrome plated.

2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories, and solid blocking within panel where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.
- E. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Coordinate layout and installation of supports, inserts, and anchors built into other units of work for toilet compartment anchorage.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position indicated with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch (13 mm).
 - b. Panels and Walls: 1 inch (25 mm).
 2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer three brackets attached at midpoint and near top and bottom of panel.
 - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
 3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches (51 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- D. Floor-and-Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.
- E. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging

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doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.13

SECTION 102219 - DEMOUNTABLE PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Section 081213, Hollow Metal Frames.
- B. Section 081416, Flush Wood Doors.
- C. Section 097200, Prefinished Gypsum Board.

1.2 SYSTEM DESCRIPTION

- A. Complete interior wall system, 3-1/2-inch thick, to include door frames, glazed openings, aluminum trims and PVC base.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each type of demountable-partition assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For demountable partitions to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer to certify that all materials meet or exceed these specifications.
- B. Sound Transmission: Provide independent laboratory certification that wall system provides 35 STC when tested in accordance with ASTM E90.
- C. Point Accessibility: System design shall for all panels be point accessible without affecting adjoining panels.
- D. Fire Rating: (When Required) Provide independent laboratory certification that system has passed a one-hour fire endurance and hose stream test in accordance with ASTM E119.
- E. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 FIELD CONDITIONS

- A. Finished Spaces: Do not deliver or install demountable partitions until finishes in spaces to receive them are complete, including suspended ceilings, floors, carpeting, and painting.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Framing:
 - 1. Top track – Roll formed steel with hemmed legs designed to accept snap-on, snap-off aluminum ceiling trim from either side of the wall.
 - 2. Floor track – Roll formed steel with 1-1/2" high legs.
 - 3. Stud Framing: "U" shaped stud with 11-inch cross locking channels and roll formed standard studs.
- C. Panels: System design shall accommodate prefinished gypsum board.
- D. Glazing components: Shall be aluminum (6063-T5) and shall integrate with ceiling track and door frames.
- E. Door frames: Aluminum (6063-T5) door frames in 7-foot and 9-foot standard opening heights designed to integrate with ceiling track and glazing.
- F. Trims:
 - 1. Battens, ceiling trim and corners are aluminum snap-on type. Color to match building standards.
 - 2. Base trim to match building standard.
- G. Structural Performance: Provide demountable partitions capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Load-Bearing Capacity: Not less than 300-lb (136-kg) concentrated proof load when tested according to BIFMA X 5.6.
 - 2. Transverse-Load Capacity: Lateral deflection of not more than 1/120 of the overall span when tested under a uniformly distributed load of 5 lb/sq. ft. (24.4 kg/sq. m) according to ASTM E72.

- H. Acoustical Performance: Where acoustical rating is indicated, provide demountable-partition assembly tested by a qualified testing agency for sound transmission loss performance according to ASTM E90, calculated according to ASTM E413, and rated for not less than the STC value indicated.

2.2 SITE-ASSEMBLED DEMOUNTABLE PARTITIONS

- A. General: Site-assembled, progressive demountable-partition assembly and components that are the standard products of manufacturer.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DIRTT Environmental Solutions.
 - b. Gravity Lock Systems, Inc.
 - c. MAARS Living Walls; Maars US Inc.
- B. Acoustical Rating: STC 35.
- C. Face Panels: Prefinished gypsum board substrate.
1. Thickness: As indicated on Drawings.
 2. Panel Widths: Modular, 48-inches (1219 mm), except for required filler panels.
 3. Finish: As indicated on Drawings.
 - a. Color: As indicated on Drawings.
 4. Facing: Vinyl wall covering.
 - a. Color, Texture, and Pattern: As indicated in drawings.
- D. Framing: aluminum studs and top and bottom tracks, 2-1/2 inches (64 mm) deep.
- E. Trim: Continuous, factory-finished, snap-on type; adjustable for variations in floor and ceiling levels.
1. Trim Material: Aluminum.
 2. Panel Joints: Butt joints without trim.
 3. Outside Corner Trim: Square.
 4. Base Profile: Projected.
 5. Ceiling Trim Profile: Projected.
 6. Exposed-Metal Trim Finish: Factory-applied, baked-enamel or powder-coat finish.
 7. Trim Color: To match existing building standards.
- F. Doors: As specified in Section 081416 "Flush Wood Doors. "
- G. Doors: Manufacturer's standard 1-3/4-inch- (45-mm-) thick, solid-core wood door construction.

1. Door Operation: Swinging.
2. Door Finish: Wood veneer.
 - a. Color, Texture, and Pattern: To match existing building standards.
 - b. Wood-Veneer Species and Finish: Red oak with transparent finish.
- H. Door Frames: Manufacturer's standard aluminum frames for 1-3/4-inch (45-mm) doors, factory mortised to receive hardware.
 1. Frame Finish: Factory-applied, baked-enamel or powder-coat finish.
 2. Frame Color: To match existing building standards.
- I. Door Hardware: As specified in Section 087111 "Door Hardware (Descriptive Specification)."
- J. Seals: Manufacturer's standard.
- K. Electrical Devices: Integral, concealed raceways to serve electrical power and communication devices indicated on Drawings.
 1. 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.

2.3 FABRICATION

- A. General: Fabricate demountable walls for installation with concealed fastening devices and pressure-fit members that will not damage ceiling or floor coverings. Fabricate systems for installation with continuous seals at floor, ceiling, and other locations where partitions abut fixed construction.
- B. Panels for Site-Assembled Demountable Partitions: Face panels fabricated and finished in modular widths indicated.
 1. Transom Panels: Fabricated in material and finish to match wall panels unless otherwise indicated.
- C. Panels for Unitized-Panel Demountable Partitions: Factory-assembled, flush, unitized-panel construction; with faces smooth and free of buckles, oil-canning, and seams; and insulated with solidly packed, inorganic, mineral filler.
 1. Factory glaze panels to the greatest extent possible.
- D. Finish Facings: Factory apply finish-facing materials with appropriate backings, using mildew-resistant non-staining adhesive as recommended by finish-material manufacturer's written instructions.
 1. Apply facing to panel in one piece, seamless, and with no gaps or overlaps; free of air bubbles, wrinkles, blisters, or other defects.

2. Tightly secure and conceal raw and selvage edges of facing for finished appearance.

2.4 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.6 STEEL FINISH

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry-film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine components before installation. Reject components that are wet, moisture damaged, mold damaged, broken, cracked, chipped, deformed, or unmatched.
- C. Examine roughing-in for electrical power to verify actual locations of power connections before partition installation.
- D. Verify that floor and ceilings are level and ready to accept partition. Facility should be clean, dry, and protected from outside weather.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install demountable partitions after other finishing operations have been completed.
 - 1. Install partitions rigid, level, plumb, and aligned. Install seals at connections with floors, ceilings, fixed walls, and abutting surfaces to prevent light and sound transmission. Adjust to correct for any floor irregularities.
 - 2. Except for filler panels scribed to fixed walls or columns, do not modify manufacturer's standard components.
 - 3. At carpeted floors, screw partition to the floor to secure the partition. At suspended ceiling use ceiling clips that rigidly secure the partition without defacing or damaging the grid or acoustical tiles.
 - 4. Position studs vertically in floor and ceiling tracks at 24-inches as required by panel size. Install three to four cross channels per stud in accordance with manufacturer's instructions.
 - 5. Install panel clips in accordance with manufacturer's instructions. Hang panels on framework taking care to seat all panel clips on cross channels.
 - 6. Cut and fit all panels to fit neatly to existing walls, window mullions, and building columns. Butt panels together to ensure a tight, single line joint.
 - 7. Install ceiling trims, base molding, corners, and other trims in accordance with manufacturer's instructions.

- B. Doors and Frames: Install door-and-frame assemblies securely anchored to partitions and with doors aligned and fitted. Install and adjust door hardware for proper operation.
 - 1. Mechanically fasten the floor track to the substrate at both sides of the door frames, finished ends, and other areas where additional rigidity is required.

- C. Electrical Devices: Connect integral, concealed wiring to serve electrical power and communication devices indicated on Drawings.
 - 1. Connect electrical service at junction-box locations according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - 2. Connect data communication service at junction-box locations according to Section 271513 "Communications Copper Horizontal Cabling."

3.3 ERECTION TOLERANCES

- A. Install each demountable partition so surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent partitions.

3.4 ADJUSTING

- A. Inspect installation, correct misalignments, and tighten loose connections.

- B. Doors: Adjust doors to operate smoothly and easily, without binding or warping. Adjust hardware to function smoothly and lubricate as recommended by manufacturer. Verify that latches and locks engage accurately and securely without forcing or binding.

- C. Remove and replace defaced or damaged components that cannot be satisfactorily repaired.

END OF SECTION 102219

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated, acoustical panel partitions.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for supports that attach supporting tracks to overhead structural system.
2. Section 092900 "Gypsum Board" for fire-rated assemblies and sound barrier construction above the ceiling at track.

1.2 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

B. STC: Sound Transmission Class.

1.3 ACTION SUBMITTALS

A. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable partition, component, and accessory specified.

B. Shop Drawings: Show location and extent of operable partitions.

1. Include plans, elevations, sections, details, attachment to other construction, accessories, and numbered panel installation sequence.
2. Indicate dimensions, weights, conditions at openings, and at storage areas, and required installation, storage, and operating clearances.
3. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel.

C. Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.

- D. Samples for Initial Selection: Color samples demonstrating full range of finishes available by architect. Verification samples will be available in same thickness and material indicated for the work.
- E. Samples for Verification: For each type of exposed material, finish, covering, or facing, prepared on Samples of size indicated below:
 - 1. Textile Facing Material: Full width by not less than 36-inch- (914-mm-) long section of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat.
 - 2. Panel Facing Material: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
 - 3. Panel Edge Material: Not less than 3 inches (75 mm) long.
 - 4. Chair Rail: Manufacturer's standard-size unit, 6 inches (150 mm) long.
 - 5. Glass: Units 12 inches (300 mm) square.
 - 6. Hardware: One of each exposed door-operating device.
- F. Reports: Provide a complete and unedited written sound test report indicating test specimen matches product as submitted.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Partition track, track supports and bracing, switches, turning space, and storage layout.
 - 2. Suspended ceiling components.
 - 3. Structural members to which suspension systems will be attached.
 - 4. Size and location of initial access modules for acoustical tile.
 - 5. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. HVAC ductwork, outlets, and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Smoke detectors.
 - f. Access panels.
 - 6. Plenum fire, smoke, and acoustical barriers.

- B. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.
- C. Seismic Qualification Certificates: For operable panel partitions, tracks, accessories, and components, from manufacturer. Include seismic capacity of partition assemblies to remain in vertical position during a seismic event and the following:
 - 1. Basis for Certification: Indicate whether certification is based on analysis, testing, or experience data, according to ASCE/SEI 7.
 - 2. Detailed description of partition anchorage devices on which the certification is based and their installation requirements.
- D. Product Certificates: For each type of operable panel partition.
- E. Product Test Reports: For each operable panel partition, for tests performed by a qualified testing agency.
- F. Field quality-control reports.
- G. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
 - b. Seals, hardware, track, track switches, carriers, and other operating components.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Panel Finish-Facing Material: Furnish full width in quantity to cover both sides of two panels when installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of operable panel partitions.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period: Two years from date of Substantial Completion.
 - 3. Suspension System Warranty: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, PRODUCT, AND OPERATION

- A. Basis of Design: Modernfold, Inc. - Reference sheet A-503. Or, subject to compliance with requirements, provide product by one of the following manufacturers:
 - 1. Hufcor, Inc.
 - 2. KWIK-WALL Company
 - 3. Modernfold, Inc.
- B. Doors to be manufactured in the U.S.A.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Operable panel partitions are to withstand the effects of earthquake motions determined according to ASCE/SEI.
 - 1. The term "withstand" means "the partition panels will remain in place without separation of any parts when subjected to the seismic forces specified."

- B. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
 - 1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E90, determined by ASTM E413, and rated for not less than the STC indicated.
 - 2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance according to ASTM C423, and rated for not less than the NRC indicated.

- C. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol.

2.3 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hufcor, Inc.
 - b. Moderco Inc.
 - c. Modernfold, Inc.

- B. Basis-of-Design Product: Refer to drawings for Specification of Operable Acoustical Panels.

- C. Panel Operation: Manually operated, individual panels and paired panels.

- D. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.

- E. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
 - 1. Panel Width: Equal widths.
- F. STC: Not less than 44 per ASTM E90-70.
- G. Panel Weight: 6 lb/sq. ft. (40 kg/sq. m) to 10 lb/sq. ft. (50 kg/sq. m).
- H. Panel Thickness: Nominal dimension of 3 inches (75 mm).
- I. Panel Materials:
 - 1. Medium Duty Vinyl: Reinforced with woven backing.
 - 2. Steel Frame: Steel sheet, 0.0625-inch (1.5875-mm) nominal minimum thickness for uncoated steel.
 - 3. Steel Face/Liner Sheets: Tension-leveled steel sheet, manufacturer's standard minimum nominal thickness for uncoated steel.
 - 4. Gypsum Board: ASTM C1396/C1396M.
 - 5. Medium-Density Fiberboard: ANSI A208.2.
- J. Panel Closure: Manufacturer's standard unless otherwise indicated.
 - 1. Initial Closure: Full leaf butt hinges, attached directly to the panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame.
 - 2. Final Closure: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation.
- K. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
 - 1. Hinges: Concealed (invisible).
- L. Finish Facing: Reinforced vinyl with woven backing. Units shall be factory applied heavy duty Class "A" flame spread rating.

2.4 SEALS

- A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:
 - 1. Manufacturer's standard seals unless otherwise indicated.
 - 2. Seals made from materials and in profiles that minimize sound leakage.

3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
- B. Horizontal Top Seals: Continuous-contact, resilient seal exerting uniform constant pressure on track or resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on track when extended.
- C. Horizontal Bottom Seals:
1. Manufacturer's standard continuous-contact seal exerting uniform constant pressure on floor.
 2. Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
 3. Mechanically Operated for Acoustical Panels: Extension and retraction of bottom seal by operating handle or built-in operating mechanism, with operating range not less than 2 inches (50 mm) between retracted seal and floor finish.

2.5 PANEL FINISH FACINGS

- A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant non-staining adhesive as recommended by facing manufacturer's written instructions.
1. Apply one-piece, seamless facings free of air bubbles, wrinkles, blisters, and other defects, with edges tightly butted, and with invisible seams complying with Shop Drawings for location, and with no gaps or overlaps. Horizontal seams are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.
 2. Where facings with [directional or repeating patterns or directional weave] [directional, repeating, or matching grain] are indicated, mark facing top and attach facing in same direction.
 3. Match facing pattern 72 inches (1830 mm) above finished floor.
- B. Vinyl-Coated Fabric Wall Covering: Manufacturer's standard, mildew-resistant, washable, vinyl-coated fabric wall covering; complying with WA-101, Type II-Medium Duty; Class A.
1. Total Weight: 20 ounces (567 grams) per linear yard.
 2. Color/Pattern: As selected by Architect from manufacturer's full range. Color to coordinate with Prefinished Gypsum Board.
- C. Paint: Manufacturer's standard factory-painted finish.

1. Color: As selected by Architect from manufacturer's full range.
- D. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing, finished as follows:
1. Steel, Painted: Finished with manufacturer's color as selected by Architect from manufacturer's full range.
- E. Trimless Edges: Fabricate exposed panel edges so finish facing wraps uninterrupted around panel, covering edge and resulting in an installed partition with facing visible on vertical panel edges, without trim, for minimal sightlines at panel-to-panel joints.

2.6 SUSPENSION SYSTEMS

- A. Tracks: Steel with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch (2.54 mm) between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
1. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
1. Multidirectional Carriers: Capable of negotiating intersections without track switches.
- C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.
1. L Intersections: Allow panels to change 90 degrees in direction of travel.
 2. T Intersections: Allow panels to pass through or change 90 degrees to another direction of travel.
 3. X Intersections: Allow panels to pass through or change travel direction full circle in 90-degree increments and allow one partition to cross track of another.
 4. Multidirectional Switches: Adjustable switch configuring track into L, T, or X intersections and allowing panels to be moved in all pass-through, 90-degree change, and cross-over travel direction combinations.
 5. Center carrier stop.

- D. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish unless otherwise indicated.
- E. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.

2.7 ACCESSORIES

- A. Pass Doors: Swinging door built into and matching panel materials, construction, acoustical qualities, finish and thickness, complete with frames and operating hardware. Hinges finished to match other exposed hardware.
 - 1. Accessibility Standard: Fabricate doors to comply with applicable provisions in ICC A117.1.
 - 2. Single Pass Door: 36 by 84 inches (914 by 2134 mm).
 - 3. Pass-Door Hardware: Equip pass door with the following:
 - a. Door Seals: Sweep floor seals.
 - b. Panic hardware.
 - c. Concealed door closer.
 - d. Door Viewer: Installed with view in direction of swing.
 - e. Exit Sign: Recessed, self-illuminated.
 - f. Latchset: Passage set.
 - g. Lock, Key Operated: Key-operated lock with cylinder, keyed to master key system, operable from both sides of door. Include two keys per lock.
- B. Storage Pocket Door: Full height at end of partition runs to conceal stacked partition; of same materials, finish, construction, thickness, and acoustical qualities as panels; complete with operating hardware and acoustical seals at soffit, floor, and jambs. Hinges in finish to match other exposed hardware.
 - 1. Manufacturer's standard method to secure storage pocket door in closed position.
 - 2. Rim Lock, Key Operated: Key-operated lock cylinder, keyed to master key system, to secure storage pocket door in closed position. Include two keys per lock.
- C. Work Surfaces: Quantities, placement, and size indicated.
 - 1. Surface: Porcelain steel marker/projection surface.
 - 2. Surface Color: White.
 - 3. Size: As indicated on Drawings.
 - 4. Trim: Aluminum slip-on or snap-on trim with no visible screws or exposed joints and with corners mitered to a neat, hairline joint.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Install panels in numbered sequence indicated on Shop Drawings.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.

3.3 FIELD QUALITY CONTROL

- A. An operable panel partition installation will be considered defective if it does not pass tests and inspections.
- B. Prepare test and inspection reports.

3.4 CLEANING AND PROTECTION

- A. Clean partition surfaces upon completion of installation of operable partitions to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.
- B. Provide final protection and maintenance conditions in a manner acceptable to the manufacturer and Installer that ensure operable partitions are without damage or deterioration at time of Substantial Completion.

3.5 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust pass doors and storage pocket doors to operate smoothly and easily, without binding or warping.

- C. Verify that safety devices are functioning properly.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239

SECTION 102600 – WALL AND DOOR PROTECTION

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. Wall coverings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Showing locations, extent, and installation details of wall covering products.
- C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.
 - 1. Include Samples of accent strips and accessories to verify color selection.
- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Wall Covering: 6 by 6 inches (150 by 150 mm) square.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of handrail.
- B. Material Certificates: For each type of exposed plastic material.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.7 QUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Not less than 5 years experience in the production of specified products and a record of successful in-service performance.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Materials must be stored flat.

1.9 PROJECT CONDITIONS

- A. Installation areas must be enclosed and weatherproofed before installation commences.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall-protection units that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.

2.3 WALL COVERINGS

- A. Sheet Wall Covering (WP-1): Fabricated from semirigid, plastic sheet wall-covering material.
 1. Basis of Design: Reference Finish Legend on sheet A-140, or subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Construction Specialties, Inc.
 - b. inpro Corporation.
 - c. Koroseal Interior Products, LLC.
 2. Size: 48 by 96 inches.
 3. Sheet Thickness: 0.0625 inches (1.59 mm).
 4. Color and Texture: As indicated on drawings.
 5. Height: Full wall.
 6. Trim and Joint Moldings: Extruded rigid plastic that matches wall-covering color.
 7. Mounting: Adhesive.

2.4 MATERIALS

- A. Finishes: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applications and designations, detail, finish, and sizes.
- B. Accessories:
 1. Mounting: Stainless steel wall protection shall be furnished as a complete packaged system, including appropriate adhesive or mechanical fasteners.

2.5 FABRICATION

- A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall covering according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall covering in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
- D. Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Samples: For each type of exposed finish required.

C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semi recessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.
- 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.

2.3 FIRE-PROTECTION CABINET

- A. Basis of Design: Match existing building standard, or subject to compliance with requirements, provide products by one of the following:
 - a. Babcock-Davis.
 - b. J. L. Industries, Inc.; Activar Construction Products Group, Inc.
 - c. Larsen's Manufacturing Company.
- B. Cabinet Type: Suitable for fire extinguisher.
- C. Cabinet Construction: Nonrated.
- D. Cabinet Material: Stainless steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- E. Recessed Cabinet:
 - 1. Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box, to act as drywall bead.
 - 2. Trimless with Hidden Flange: Flange of same metal and finish as box overlaps surrounding wall finish and is concealed from view by an overlapping door.
 - 3. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

- F. Semi recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
 - 1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.
- G. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
- H. Cabinet Trim Material: Stainless steel sheet.
- I. Door Material: Stainless steel sheet.
- J. Door Style: Flush opaque panel, frameless, with no exposed hinges.
- K. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - 1. Provide projecting door pull and friction latch.
 - 2. Provide pivot hinge, permitting door to open 180 degrees.
- L. Accessories:
 - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
 - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Silk-screened.
 - 3) Lettering Color: Red.
 - 4) Orientation: Horizontal.
- M. Materials:
 - 1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
 - a. Finish: ASTM A480/A480M No. 4 directional satin finish.

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 - 1. Weld joints and grind smooth.
 - 2. Miter corners and grind smooth.
 - 3. Provide factory-drilled mounting holes.

4. Prepare doors and frames to receive locks.
 5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
 2. Fabricate door frames of one-piece construction with edges flanged.
 3. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semi recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for recessed and semi recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. Fire-Protection Cabinet Mounting Height: 42 inches (1067 mm) above finished floor to top of fire extinguisher.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semi recessed fire-protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:

1. Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
 - 1. Section 104413 "Fire Protection Cabinets."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Basis of Design: Match existing building standards, or subject to compliance with requirements, provide products by one of the following:
 - a. Babcock-Davis.
 - b. J. L. Industries, Inc.; Activar Construction Products Group, Inc.
 - c. Larsen's Manufacturing Company.
- 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
- B. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
- C. Multipurpose Dry-Chemical Type: UL-rated 3-A:40-B:C, 5-lb (2.3-kg), with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Babcock-Davis.
 - b. J. L. Industries, Inc.; Activar Construction Products Group, Inc.
 - c. Larsen's Manufacturing Company.
 - 2. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.
 - 1. Mounting Height: Top of fire extinguisher to be at 42 inches (1067 mm) above finished floor.

END OF SECTION 104416

SECTION 122113 - HORIZONTAL LOUVER BLINDS

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. Horizontal louver blinds with aluminum slats.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for wood blocking and grounds for mounting horizontal louver blinds and accessories.

1.3 ACTION SUBMITTALS

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

- B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.

- C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.

- D. Samples for Initial Selection: For each type and color of horizontal louver blind.

- 1. Include Samples of accessories involving color selection.

- E. Samples for Verification: For each type and color of horizontal louver blind indicated.

- 1. Slat: Not less than 12 inches (300 mm) long.
 - 2. Tapes: Full width, not less than 6 inches (150 mm) long.
 - 3. Horizontal Louver Blind: Full-size unit, not less than 16 inches (400 mm) wide by 24 inches (600 mm) long.
 - 4. Valance: Full-size unit, not less than 12 inches (300 mm) wide.

- F. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hunter Douglas, Inc.
 2. Levolor Inc.
 3. Springs Window Fashions; SWFcontract.
- B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.
1. Width: 1 inch (25 mm).
 2. Thickness: Not less than 0.006 inch (0.15 mm).
 3. Spacing: Manufacturer's standard.
 4. Finish: Match existing building standard finish.
- C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.
1. Capacity: One blind(s) per headrail unless otherwise indicated.
 2. Ends: Manufacturer's standard.
 3. Manual Lift Mechanism:
 - a. Lift-Cord Lock: Top locking; stops lift cord when blind is in fully opened or fully closed positions only; equipped with ring pull not more than 4 inches (100 mm) long.
 - b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
 4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
 - a. Tilt: Full.
 - b. Operator: Clear-plastic wand.
 - c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.
 5. Manual Lift-Operator and Tilt-Operator Lengths: Manufacturer's standard.
 6. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard, unless otherwise indicated.
- D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.
1. Type: Manufacturer's standard.
- E. Lift Cords: Manufacturer's standard braided cord.
- F. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
1. Type: Braided cord.

- G. Valance: Manufacturer's standard.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
 - 1. Type: Wall.
 - 2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.
- I. Colors, Textures, Patterns, and Gloss:
 - 1. Slats: As indicated on Drawings.
 - 2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

- A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch (6 mm) per side or 1/2 inch (13 mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
 - 2. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.
- D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.
- F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
 1. Locate so exterior slat edges are not closer than 1 inch (25 mm) from interior faces of glass and not closer than 1/2 inch (13 mm) from interior faces of glazing frames through full operating ranges of blinds.
 2. Install mounting and intermediate brackets to prevent deflection of headrails.
 3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

- A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

- A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 122113

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Manually operated roller shades with single rollers.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
 - 2. Section 079200 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

- C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.

- D. Samples for Initial Selection: For each type and color of shadeband material.

- 1. Include Samples of accessories involving color selection.

- E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark interior face of material if applicable.
2. Roller Shade: Full-size operating unit, not less than 16 inches (400 mm) wide by 36 inches (900 mm) long for each type of roller shade indicated.
3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.

F. Product Schedule: For roller shades.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of shadeband material.
- C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than Ten (10) units.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS (WS-1) – Reference Finish Legend on sheet A-140.

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Draper, Inc.
 - 2. Hunter Douglas, Inc.
 - 3. Levolor Inc.
 - 4. MechoShade Systems, LLC.
 - 5. Springs Window Fashions; SWFcontract.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Stainless steel.

- a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Clip, jamb mount.
2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
 - a. Provide for shadebands that weigh more than 10 lb (4.5 kg) or for shades as recommended by manufacturer, whichever criterion is more stringent.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 1. Roller Drive-End Location: Right side of interior face of shade.
 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- F. Shadebands:
 1. Shadeband Material: Light-filtering fabric.
 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.
- G. Installation Accessories:
 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - a. Shape: L-shaped.
 - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 3 inches (76 mm).

2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
 - a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 3 inches (76 mm).
3. Endcap Covers: To cover exposed endcaps.
4. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
 - a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches (102 mm).
 - b. Provide pocket with lip at lower edge to support acoustical ceiling panel.
5. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
 - a. Closure-Panel Width: 2 inches (51 mm).
6. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
7. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
8. Installation Accessories Color and Finish: Architect to select from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
 1. Source: Roller shade manufacturer.
 2. Type: Woven polyester and PVC-coated polyester.
 3. Weave: Mesh.
 4. Roll Width: 60 inches (1524 mm) in order to eliminate visible seams.

5. Orientation on Shadeband: As required to eliminate visible seams.
6. Openness Factor: 3 percent.
7. Color: As selected by Architect from manufacturer's full range.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units without seams in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
 2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
 2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad countertops.
2. Accessories.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Plastic-laminate-clad countertops.
2. Accessories.

B. Sustainable Design Submittals:

1. GREENGUARD Certification.
2. Recycled Content.
3. TVOC (Total Volatile Organic Compounds).

C. Shop Drawings: For plastic-laminate-clad countertops.

1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.
2. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad countertops.
3. Apply AWI Quality Certification Program label to Shop Drawings.

D. Samples: Plastic laminates in each type, color, pattern, and surface finish required in manufacturer's standard size.

E. Samples for Initial Selection: For plastic laminates.

F. Samples for Verification: As follows:

1. Plastic Laminates: For each type, color, pattern, and surface finish required, **8 by 10 inches** (200 by 250 mm) in size.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For **Installer** and **fabricator**.

B. Product Certificates: For the following:

1. Composite wood products.
2. **High-pressure** decorative laminate.
3. Chemical-resistant, high-pressure decorative laminate.
4. Adhesives.

- C. Quality Standard Compliance Certificates: **AWI Quality Certification Program**.
- D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
1. Shop Certification: **AWI's Quality Certification Program accredited participant.**
- B. Installer Qualifications: **AWI's Quality Certification Program accredited participant.**

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Environmental Limitations with Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 75 deg F (24 deg C) and relative humidity between **45 to 55** percent during the remainder of the construction period.
- C. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- D. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.
1. Provide inspections of fabrication and installation together with labels and certificates from **AWI** certification program indicating that countertops comply with requirements of grades specified.
- B. Laminate Grade: **Grade CC (HCS), 0.034 inches (0.86 mm)**.
- C. **High-Pressure** Decorative Laminate: ISO 4586-3, **Grade HGP**.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. **Formica Corporation.**
 - b. **Nevamar Company, LLC.**
 - c. **Wilsonart LLC.**
- D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. Basis of Design: As indicated by manufacturer's designations.
 2. As selected by Architect from manufacturer's full range in the following categories:
 - a. Solid colors, **matte** finish.
 - b. Solid colors with core same color as surface, **matte** finish.
- E. Edge Treatment: **As indicated on Drawings.**
- F. Substrate Material: 45# density, industrial grad particleboard (CS 236-66; Type 1, Grade B, Class 2) or Medium Density Fiberboard (MDF).
1. Plywood, underlayment and solid lumber substrate not acceptable.
- G. Substrate Material at Sinks: **MDF made with exterior glue.**
- H. Substrate Thickness: 45# density, industrial grad particleboard (CS 236-66; Type 1, Grade B, Class 2) or

1. Build up countertop thickness to **1-1/2 inches** (38 mm) at front, back, and ends with additional layers of core material laminated to top.

- I. Backer Sheet: Provide plastic-laminate backer sheet, ISO 4586-3, grade to match exposed surface, on underside of countertop substrate.

- J. Paper Backing: Provide paper backing on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.

1. MDF: Medium-density fiberboard, ANSI A208.2 [**Grade 130**]
2. Particleboard: ANSI A208.1 [**Grade M-2-Exterior Glue**].

2.3 ACCESSORIES

- A. Trash Grommet: **12 inches** (305 mm) wide by **2-inch** (50.8 mm) deep; brushed stainless steel; trash ring with **1/4-inch** (6.4-mm) lip.

1. Color: Brushed Stainless Steel

2.4 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: **Type I, waterproof type** as selected by fabricator to comply with requirements.

- B. Installation Adhesive:

1. Waterproof PVAc adhesive is preferred.
2. Contact Adhesive: Use a non-pigmented adhesive.

2.5 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

- B. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of **1 inch** (25 mm) over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: **1/16 inch** (1.5 mm) unless otherwise indicated.

- C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and

installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

- D. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in countertops with concealed clamping devices located within **6 inches** (150 mm) of front and back edges and at **intervals not exceeding 24 inches** (600 mm). Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical-treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

- F. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a **1/8-inch-in-96-inches** (3-mm-in-2400-mm) variation from a straight, level plane.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semi exposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches** (1220 mm) o.c. Remove protection at Substantial Completion.

END OF SECTION 123623.13

SECTION 125100 – FREESTANDING OFFICE FURNITURE DEMO & INSTALLATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS:
EXISTING Freestanding furniture installation.

1.2 RELATED SECTIONS

- A. Division 26 (for PRIVATE OFFICES)
- B. Section 12 59 00 – Systems Furniture Demo/Installation that occurs during same phase

1.3 CERTIFIED FURNITURE INSTALLERS, LICENSED ELECTRICIAN AND CERTIFIED TELECOMMUNICATIONS INSTALLER

- A. INSTALLATION SHALL BE SUBCONTRACTED TO A COMMERCIAL OFFICE FURNITURE INSTALLATION COMPANY, WITH PROFESSIONALLY TRAINED CERTIFIED TECHNICIANS. SUBJECT TO APPROVAL BY STATE & ARCHITECT. A MOVING COMPANY IS NOT ACCEPTABLE FOR SYSTEMS FURNITURE INSTALLATION THAT MAY OCCUR WITHIN PRIVATE OFFICES.
- B. PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS: A MOVER IS ACCEPTABLE FOR MOVING OF CRATES, REMOVAL & REINSTALLATION OF PRIVATE OFFICE AND CONFERENCE ROOM FURNITURE, FILING CABINETS, TASK CHAIRS, ETC.
- C. Refer to drawings for any additional electrical or data required where existing freestanding furniture is being re-installed.

1.4 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Salvage all existing furniture that is removed, and return to State of Missouri.
- C. Furniture Inspection.
- D. Storage
 - i. PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS:
 - a) GC TO PROVIDE LOCKABLE CLIMATE-CONTROLLED OFF-SITE STORAGE FACILITY IN WHICH INVENTORY / TAGGED

FURNITURE AND CRATES (PERSONAL CONTENTS) CAN BE SECURELY STORED UNTIL RE-INSTALLATION.

- b) ALL TRANSPORTATION TO & FROM OFF-SITE STORAGE IS THE RESPONSIBILITY OF THE GC / GC'S INSTALLER / GC'S MOVER.
 - c) NOTE THAT THE BUILDING DOCK CANNOT ACCOMMODATE 18-WHEELER TRUCKS. GC IS RESPONSIBLE FOR UNDERSTANDING DOCK & ELEVATOR ACCESS AND CAPACITY. GC TO PROVIDE FLOOR & WALL PROTECTION AT ELEVATORS USED DURING CONSTRUCTION.
- E. PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS: FURNITURE REMOVAL AND INSTALLATION OCCURS IN PHASES. REFER TO PHASING SCHEDULE.
 - F. Handling: Handle materials to avoid damage.
 - G. Furniture Staging Area.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
- B. PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS - NOTE: THE FIRST PHASE OF RENOVATION IS COMPRISED OF THE SWING SPACES, WHICH INCLUDE 11TH & 14TH FLOORS, (2) AREAS IN BASEMENT, AND (1) ROOM ON 9TH FLOOR.
- C. PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS: AS EACH NEW RENOVATION PHASE BEGINS, AND FURNITURE IS REMOVED PER THE FURNITURE DEMO PLANS (SHEETS A-110 THROUGH A-118), GC'S INSTALLER SHALL REFER TO, AND BE AWARE OF, FREESTANDING PRIVATE OFFICE FURNITURE TO BE RETURNED IN SAME CONFIGURATION. OTHER FURNITURE WILL BE SALVAGED AND RETURNED TO STATE OF MISSOURI.

PART 2 PRODUCTS

2.1 EXISTING FURNITURE TO BE REUSED

- A. FREESTANDING FURNITURE AT PRIVATE OFFICES, CONFERENCE ROOMS, STORAGE, COMMON AREAS: AFTER RENOVATION / NEW FLOORING INSTALLATION, GC'S INSTALLER/MOVER TO RETURN ITEMS FROM STORAGE AND RE-INSTALL TAGGED FURNITURE ITEMS (TABLES, CHAIRS, CREDENZA, BOOKCASES) BACK INTO ROOMS IN EXACT PLACEMENT (U.N.O BY OWNER).

- B. NO EXISTING PLANS EXIST FOR PRIVATE OFFICES OR MOST CONFERENCE ROOMS. GC SHALL ASSESS SCOPE & QUANTITY OF PRIVATE OFFICE FURNITURE DURING BID WALK THROUGH. COORDINATE WITH OWNER & MCCLURE ENGINEERING FOR ACCESS TO MATTERPORT AND TO UNDERSTAND REQUIREMENTS REGARDING ADDITIONAL PHOTO & VIDEO FIELD VERIFICATION (SENSITIVE INFORMATION) IN REGARD TO PRIVATE OFFICE & CONFERENCE ROOM CONFIGURATION, QUANTITIES, PLACEMENT (RE-INSTALL PER EXISTING LAYOUTS U.N.O.).
- C. GC IS RESPONSIBLE TO VERIFY EXISTING CONDITIONS AT THE BEGINNING OF EACH PHASE.
- D. GC TO RETURN ITEMS FROM STORAGE AND REINSTALL EXISTING CONFERENCE ROOM FURNITURE TO SAME LOCATION ON FLOORS 2 THROUGH 14 U.N.O. REFER TO ROOMS NAMED "CONF" OR "CONFERENCE".
- E. 1ST FLOOR: GC SHALL INSTALL EXISTING BOARD ROOM FURNITURE INTO NEW 1ST FLOOR BOARD ROOM.
- F. NOTE: IN NEW 1ST FLOOR NEW PRIVATE OFFICES, AGENCY/OWNER WILL PROVIDE AND INSTALL ALL PRIVATE OFFICE FURNITURE.
- G. REFER TO 1ST FLOOR "CAFÉ" & 1ST FLOOR "MAIL" DEMO/ARCHITECTURAL INFO IN THE ARCHITECTURAL PLANS.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction. Test for proper operation and adjust until satisfactory results are obtained.
- B. GC / GC'S INSTALLER TO NOTE SIZES AND COMPONENTS THAT COMPRISE EACH CONFIGURATION
- C. PRIVATE OFFICE & CONFERENCE ROOM FREESTANDING FURNITURE INSTALLATION SHALL INCLUDE LABOR FOR GC'S LICENSED ELECTRICIAN TO CONNECT POWER/DATA WHERE APPLICABLE.

- D. PRIVATE OFFICE & CONFERENCE ROOM FREESTANDING FURNITURE DEMO & INSTALLATION:
- i. FOR EACH PHASE, GC'S INSTALLER TO DELIVER PLASTIC MOVING CRATES TO SWING SPACE TO DESIGNATED OFFICE OR CUBICLE (PER CRATE'S TAGS). REFER TO FURNITURE DEMO PLANS IN REGARD TO MOVING CRATES TO BE PROVIDED BY GC (SIZE, COLOR, QUANTITY, TRANSPORT), AS WELL AS RELATED LABOR.
 - ii. GC'S INSTALLER TO MOVE CRATES FROM SWING SPACE AND DELIVER PLASTIC MOVING CRATES TO FINAL DESTINATION FLOOR (TO WORKSTATION OR OFFICE PER NUMBERED ROOM/CUBICLE TAG).
 - iii. FOR EACH PHASE, OA/ OWNER//STATE/AGENCY WILL MOVE COMPUTERS, MONITORS, KEYBOARDS, COPIERS/PRINTERS/PLOTTERS TO SWING SPACE (OR THEIR STORAGE) AND TO FINAL DESTINATION FLOOR, AND WILL BE RESPONSIBLE FOR INSTALLATION AND CONNECTIONS.
 - iv. COPIERS WILL BE REMOVED AND REINSTALLED BY OWNER. GC TO PROVIDE POWER & DATA AS NOTED ON ELECTRICAL PLANS.
 - v. FOLLOWING FINAL CONSTRUCTION PHASE, GC SHALL PROVIDE LABOR TO REMOVE FURNITURE FROM SWING SPACE AREAS (FLOORS 11 & 14TH FLOORS, ROOM 907, ROOM 002 (BASEMENT); ROOM 312: REFER TO SWING SPACE PLANS. VERIFY WITH OWNER (STATE) THAT GC IS TO DISPOSE (OR IF GC IS TO MOVE ITEMS TO STATE'S WAREHOUSE AT 4720 SCRUGGS STATION, JEFFERSON CITY, MO 65109)

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. GC / GC'S INSTALLER SHALL REMOVE ALL TRASH & DEBRIS AT THE END OF EACH DAY. GC / GC'S INSTALLER IS RESPONSIBLE FOR PROTECTION OF FURNITURE FROM DAMAGE AT ALL TIMES.
- C. ANY DAMAGED FURNITURE SHALL BE IDENTIFIED AND DOCUMENTED, AND OWNER SHALL BE NOTIFIED. GC / GC'S INSTALLER IS RESPONSIBLE FOR LAYING FLOOR AND WALL PROTECTION IN PATH OF FURNITURE & CONTENTS REMOVAL AND DURING MOVES IN ALL AREAS NOT UNDER RENOVATION OR ALREADY INSTALLED.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 125100

SECTION 125420 – FREESTANDING HOSPITALITY (CAFÉ) FURNITURE DEMO & INSTALLATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. CAFE: NEW Freestanding furniture provided by State & installed by GC.

1.2 RELATED SECTIONS

- A. Section 12 64 00 – Wall Bench Furniture Specification & Installation

1.3 CERTIFIED FURNITURE INSTALLERS

- A. INSTALLATION SHALL BE SUBCONTRACTED TO A COMMERCIAL OFFICE FURNITURE INSTALLATION COMPANY, WITH PROFESSIONALLY TRAINED CERTIFIED TECHNICIANS. SUBJECT TO APPROVAL BY STATE & ARCHITECT. A MOVING COMPANY IS NOT ACCEPTABLE FOR INSTALLATION.

1.4 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Salvage all existing furniture that is removed, and return to State of Missouri.
- C. Furniture Inspection.
- D. Storage
 - i. CAFÉ: IF SPACE IS NOT READY TO RECEIVE NEW FREESTANDING FURNITURE, GC TO PROVIDE LOCKABLE CLIMATE-CONTROLLED OFF-SITE STORAGE FACILITY IN WHICH NEW CAN BE SECURELY STORED UNTIL RE-INSTALLATION.
- E. Handling: Handle materials to avoid damage.
- F. Furniture Staging Area.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 (NEW) OWNER-PURCHASED AND CONTRACTOR INSTALLED

- A. CAFÉ: NEW FREESTANDING CAFE FURNITURE TO BE PURCHASED BY STATE OF MISSOURI & INSTALLED BY GC. FURNITURE TO BE DELIVERED TO DOCK BY MVE AND RETRIEVED BY GC:
 - i. DINING TABLES
 - ii. DINING CHAIRS
 - iii. BAR TABLES
 - iv. BAR STOOLS
 - v. LOUNGE SEATING & COFFEE TABLES
- B. INSTALLATION TO OCCUR AFTER NEW FLOORING INSTALLATION.
- C. GC IS RESPONSIBLE TO VERIFY EXISTING CONDITIONS AT THE BEGINNING OF EACH PHASE.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction. Test for proper operation and adjust until satisfactory results are obtained.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. GC / GC'S INSTALLER SHALL REMOVE ALL TRASH & DEBRIS AT THE END OF EACH DAY. GC / GC'S INSTALLER IS RESPONSIBLE FOR PROTECTION OF FURNITURE FROM DAMAGE AT ALL TIMES.
- C. ANY DAMAGED FURNITURE SHALL BE IDENTIFIED AND DOCUMENTED, AND OWNER SHALL BE NOTIFIED. GC / GC'S INSTALLER IS RESPONSIBLE FOR

LAYING FLOOR AND WALL PROTECTION IN PATH OF FURNITURE & CONTENTS
REMOVAL AND DURING MOVES IN ALL AREAS NOT UNDER RENOVATION OR
ALREADY INSTALLED.

- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 125420

SECTION 125900 – SYSTEMS FURNITURE INSTALLATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Systems furniture installation.

1.2 RELATED SECTIONS

- A. Division 26 – Electrical & Data
- B. Section 12 51 00 – Freestanding Office Furniture Demo & Installation

1.3 CERTIFIED FURNITURE INSTALLERS, LICENSED ELECTRICIAN AND CERTIFIED TELECOMMUNICATIONS INSTALLER

- A. INSTALLATION SHALL BE SUBCONTRACTED TO A COMMERCIAL OFFICE FURNITURE INSTALLATION COMPANY, WITH PROFESSIONALLY TRAINED CERTIFIED TECHNICIANS. SUBJECT TO APPROVAL BY STATE & ARCHITECT. A MOVING COMPANY IS NOT ACCEPTABLE FOR SYSTEMS FURNITURE INSTALLATION.
- B. A MOVER IS ACCEPTABLE FOR MOVING OF CRATES, REMOVAL & REINSTALLATION OF PRIVATE OFFICE AND CONFERENCE ROOM FURNITURE, FILING CABINETS, TASK CHAIRS, ETC.

1.4 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. THE TERMS "WORKSTATIONS", "SYSTEMS FURNITURE" OR "CUBICLES" MAY BE USED INTERCHANGABLY FOR THIS PROJECT.
- B. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- C. BE COGNIZANT OF KEY NOTES & FURNITURE INSTALLATION PLAN DURING FURNITURE REMOVAL/DEMO, AS SOME PARTS, COMPONENTS, ENTIRE WORKSTATIONS AND/OR FREESTANDING FURNITURE WILL BE IMMEDIATELY REUSED IN THE SAME PHASE OR EVEN THE SAME FLOOR.
- D. Furniture Inspection.
- E. Storage - GC TO PROVIDE LOCKABLE CLIMATE-CONTROLLED OFF-SITE STORAGE FACILITY IN WHICH INVENTORY / TAGGED FURNITURE AND CRATES (PERSONAL CONTENTS) CAN BE SECURELY STORED UNTIL RE-INSTALLATION.

- F. ALL TRANSPORTATION TO & FROM OFF-SITE STORAGE IS THE RESPONSIBILITY OF THE GC / GC'S INSTALLER / GC'S MOVER.
- G. NOTE THAT THE BUILDING DOCK CANNOT ACCOMMODATE 18-WHEELER TRUCKS. GC IS RESPONSIBLE FOR UNDERSTANDING DOCK & ELEVATOR ACCESS AND CAPACITY. GC TO PROVIDE FLOOR & WALL PROTECTION AT ELEVATORS USED DURING CONSTRUCTION.
- H. FURNITURE REMOVAL AND INSTALLATION OCCURS IN PHASES. REFER TO PHASING SCHEDULE.
- I. Handling: Handle materials to avoid damage.
- J. Furniture Staging Area.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
- B. Swing Spaces - NOTE: THE FIRST PHASE OF RENOVATION IS COMPRISED OF THE SWING SPACES, WHICH INCLUDE 11TH & 14TH FLOORS, (2) AREAS IN BASEMENT, AND (1) ROOM ON 9TH FLOOR.
- C. AS EACH NEW RENOVATION PHASE BEGINS, AND FURNITURE IS REMOVED PER THE FURNITURE DEMO PLANS (SHEETS A-110 THROUGH A-118), GC'S INSTALLER SHALL REFER TO, AND BE AWARE OF, LIST OF PARTS PROVIDED BY OWNER / STATE OF MISSOURI IN REGARD TO THE FOLLOWING CATAGORIES:
 - i. PARTS THAT WILL BE NEEDED FOR RE-INSTALLATION ON THE (SAME) FLOOR.
 - ii. PARTS THAT WILL BE NEEDED FOR RE-INSTALLATION ON OTHER FLOOR(S) THAT ARE PART OF THE SAME PHASE.
 - iii. PARTS TO BE TAKEN TO OWNER'S STORAGE THAT WILL BE RE-INSTALLED DURING LATER PHASES.

PART 2 PRODUCTS

2.1 (NEW) OWNER-PURCHASED AND CONTRACTOR INSTALLED

- A. NEW SYSTEMS FURNITURE TO BE INSTALLED (MOSTLY IN OPEN AREAS, SOME INSIDE ROOMS, AS NOTED ON PLANS): OA/FMDC WILL PLACE THE ORDER, GC TO COORDINATE ORDER (FABRICATED AND DELIVERED TO DOCK BY MVE), RECEIPT OF DELIVERY, AND (AFTER NEW FLOORING INSTALLATION) PROVIDE INSTALLATION OF NEW SYSTEMS FURNITURE IN

LOCATIONS AS NOTED ON THE LEGEND. NEW FURNITURE WILL BE MANUFACTURED BY MVE.

- B. INSTALLATION DRAWINGS WITH MORE DETAIL WILL BE PROVIDED BY OWNER / STATE OF MISSOURI / MVE.

2.2 EXISTING FURNITURE TO BE REUSED

- A. EXISTING SYSTEMS FURNITURE TO BE RE-INSTALLED (MOSTLY IN OPEN AREAS, SOME INSIDE ROOMS, AS NOTED ON PLANS): AFTER NEW FLOORING INSTALLATION, GC TO REINSTALL EXISTING SYSTEMS FURNITURE TO NEW LOCATIONS AS NOTED IN THE LEGEND.

2.3 EXISTING FURNITURE TO BE REUPHOLSTERED AND REUSED

- A. SYSTEMS FURNITURE WITH REUPHOLSTERED PANELS TO BE INSTALLED (MOSTLY IN OPEN AREAS, SOME INSIDE ROOMS, AS NOTED ON PLANS): REUPHOLSTERY LABOR & MATERIALS WILL BE PROVIDED BY MVE.
- B. GC TO COORDINATE ORDER WITH MVE & OWNER. ANY FURNITURE SYSTEMS PANELS DESIGNATED FOR REUPHOLSTERY: IT IS THE RESPONSIBILITY OF THE GC'S INSTALLER TO MOVE THOSE ITEMS TO THE BUILDING DOCK FOR PICK UP BY MVE, AND TO COORDINATE PICK UP WITH MVE & OWNER.
- C. RETRIEVAL OF THE NEWLY REUPHOLSTERED ITEMS WILL BE PICKED UP FROM THE BUILDING DOCK, AND COORDINATED WITH MVE & OWNER.
- D. AFTER NEW FLOORING INSTALLATION, GC SHALL PROVIDE INSTALLATION OF REUPHOLSTERED SYSTEMS FURNITURE IN LOCATIONS AS NOTED ON THE PLANS.
- E. **INSTALLATION DRAWINGS WITH MORE DETAIL WILL BE PROVIDED BY OWNER / STATE OF MISSOURI / MVE**

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with

adjacent construction. Test for proper operation and adjust until satisfactory results are obtained.

- B. GC / GC'S INSTALLER TO NOTE WORKSTATION SIZES AND COMPONENTS THAT COMPRISE EACH CONFIGURATION (NEW, EXISTING, REUPHOLSTERED, ETC). REFER TO ENLARGED VIEWS. REFER TO QTY OF EACH TYPICAL THAT WILL OR WILL NOT HAVE KEYBOARD DRAWERS, MOBILE PEDESTALS, LATERAL FILES, PENCIL DRAWERS, OVERHEAD STORAGE, ETC.
- C. ANY SYSTEMS FURNITURE INSTALLATION SHALL INCLUDE LABOR FOR GC'S LICENSED ELECTRICIAN TO CONNECT POWER/DATA FOR SYSTEMS FURNITURE. GC TO PROVIDE ALL NECESSARY POWER POLES, AND FINAL CONNECTIONS. EXISTING MAY BE REUSED; GC TO DETERMINE FEASIBILITY.
- D. GC'S CERTIFIED FURNITURE INSTALLER SHALL INSTALL AND CONNECT WORKSTATIONS IN CONFIGURATION AS SHOWN IN PLANS AND PER RELATED KEY NOTES & GENERAL NOTES, UTILIZING PARTS PROVIDED BY OWNER (STATE OF MISSOURI).
- E. FINAL SYSTEMS FURNITURE INSTALLATION DRAWINGS THAT INCLUDE MORE DETAIL WILL BE PROVIDED BY OWNER (STATE OF MISSOURI). REFER TO "FURNITURE INSTALLATION GENERAL NOTES" FOR MORE INFORMATION.
- F. FOR EACH PHASE, GC'S INSTALLER TO DELIVER PLASTIC MOVING CRATES TO SWING SPACE TO DESIGNATED OFFICE OR CUBICLE (PER CRATE'S TAGS). REFER TO FURNITURE DEMO PLANS IN REGARD TO MOVING CRATES TO BE PROVIDED BY GC (SIZE, COLOR, QUANTITY, TRANSPORT), AS WELL AS RELATED LABOR.
- G. GC'S INSTALLER TO MOVE CRATES FROM SWING SPACE AND DELIVER PLASTIC MOVING CRATES TO FINAL DESTINATION FLOOR (TO WORKSTATION OR OFFICE PER NUMBERED ROOM/CUBICLE TAG).
- H. FOR EACH PHASE, OA/ OWNER//STATE/AGENCY WILL MOVE COMPUTERS, MONITORS, KEYBOARDS, COPIERS/PRINTERS/PLOTTERS TO SWING SPACE (OR THEIR STORAGE) AND TO FINAL DESTINATION FLOOR, AND WILL BE RESPONSIBLE FOR INSTALLATION AND CONNECTIONS.
- I. GC SHALL CONSULT WITH OWNER REGARDING FINAL REINSTALLATION LOCATION FOR EACH EXISTING REFRIGERATOR AND MICROWAVE THAT IS TO BE SALVAGED AND REUSED (REFER TO FURNITURE DEMO PLANS). ANY NEW REFRIGERATORS ARE PROVIDED AND INSTALLED BY OWNER (AGENCY).
- J. COPIERS WILL BE REMOVED AND REINSTALLED BY OWNER. GC TO PROVIDE POWER & DATA AS NOTED ON ELECTRICAL PLANS.
- K. FOLLOWING FINAL CONSTRUCTION PHASE, GC SHALL PROVIDE LABOR TO REMOVE FURNITURE FROM SWING SPACE AREAS (FLOORS 11 & 14TH FLOORS, ROOM 907, ROOM 002 (BASEMENT): REFER TO SWING SPACE

PLANS. VERIFY WITH OWNER (STATE) THAT GC IS TO DISPOSE (OR IF GC IS TO MOVE ITEMS TO STATE'S WAREHOUSE AT 4720 SCRUGGS STATION, JEFFERSON CITY, MO 65109)

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. GC / GC'S INSTALLER SHALL REMOVE ALL TRASH & DEBRIS AT THE END OF EACH DAY. GC / GC'S INSTALLER IS RESPONSIBLE FOR PROTECTION OF FURNITURE FROM DAMAGE AT ALL TIMES.
- C. ANY DAMAGED FURNITURE SHALL BE IDENTIFIED AND DOCUMENTED, AND OWNER SHALL BE NOTIFIED. GC / GC'S INSTALLER IS RESPONSIBLE FOR LAYING FLOOR AND WALL PROTECTION IN PATH OF FURNITURE & CONTENTS REMOVAL AND DURING MOVES IN ALL AREAS NOT UNDER RENOVATION OR ALREADY INSTALLED.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 125900

SECTION 126400 – WALL BENCH (CAFÉ) SPECIFICATION & INSTALLATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. CAFÉ: Provide Wall Bench (Banquette).
- B. CAFÉ: Install Wall Bench (Banquette).

1.2 RELATED SECTIONS

- A. Add Alternate
- B. Section 125420 – Other Café furniture to be installed same time by GC

1.3 CERTIFIED FURNITURE INSTALLERS

- A. INSTALLATION SHALL BE SUBCONTRACTED TO A COMMERCIAL OFFICE FURNITURE INSTALLATION COMPANY, WITH PROFESSIONALLY TRAINED CERTIFIED TECHNICIANS. SUBJECT TO APPROVAL BY STATE & ARCHITECT. A MOVING COMPANY IS NOT ACCEPTABLE FOR INSTALLATION.

1.4 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Salvage all existing furniture that is removed, and return to State of Missouri.
- B. Deliver and store new products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- C. Furniture Inspection.
- D. Storage
 - i. IF SPACE IS NOT READY TO RECEIVE NEW FREESTANDING FURNITURE, GC TO PROVIDE LOCKABLE CLIMATE-CONTROLLED OFF-SITE STORAGE FACILITY IN WHICH NEW CAN BE SECURELY STORED UNTIL RE-INSTALLATION.
 - ii. ALL TRANSPORTATION TO & FROM OFF-SITE STORAGE IS THE RESPONSIBILITY OF THE GC / GC'S INSTALLER.
 - iii. NOTE THAT THE BUILDING DOCK CANNOT ACCOMMODATE 18-WHEELER TRUCKS. GC IS RESPONSIBLE FOR UNDERSTANDING DOCK & ELEVATOR ACCESS AND CAPACITY. GC TO PROVIDE FLOOR & WALL PROTECTION AT ELEVATORS USED DURING CONSTRUCTION.
- E. Handling: Handle materials to avoid damage.

- F. Furniture Staging Area.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
- B. REFER TO PHASING SCHEDULE.

PART 2 PRODUCTS

2.1 (NEW) CONTRACTOR-PURCHASED AND CONTRACTOR-INSTALLED

- A. CAFÉ: NEW FREESTANDING CAFE FURNITURE TO BE PURCHASED BY GC & INSTALLED BY GC. GC TO COORDINATE ALL DELIVERY, CLIMATE-CONTROLLED STORAGE & INSTALLATION:
 - i. WALL BENCHES
- B. GC IS RESPONSIBLE TO VERIFY EXISTING CONDITIONS AT THE BEGINNING OF THIS PHASE.

2.2 BASIS OF DESIGN

- A. Manufacturer: Shelby Williams
- B. Series: Westbury Single Booth 36" high

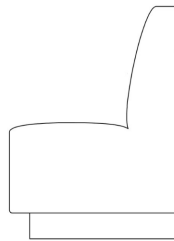


- C. Style: WB40-36 Wall Bench – Pitch, seat crown, seat height, seat depth, overall depth and base dimensions to be consistent with the standards of this style
- D. Custom lengths, including angles: refer to plan.
- E. 26" deep
- F. Acceptable Alternate: Shelby Williams MN Menlo Park

- G. Performance Characteristics:
- i. Fully Upholstered, plain inside back
 - ii. 18" seat height
 - iii. Upholstered back pad
 - iv. All units shall have fully upholstered ends
 - v. FRAME:
 - a. Constructed from solid 3/4" southern yellow pine.
 - b. All joints fastened with 2" staples, glue and corner blocks.
 - c. Some areas: 3/4" plywood.
 - vi. SEAT:
 - a. **Removable waterfall seat** shall have 9 gauge No-Sag **springs** spaced 3" on center with two 16-gauge tie wires fastened to each spring creating a grid foundation. There shall be a wire re-enforced flexilator on top, followed by two 1" layers of polyurethane foam and a bullnose detail.
 - b. Sewn seat covers shall have an additional sewn re-enforced double needle step to ensure a durable seam that will not tear open.
 - c. Seat is held in place with two plywood seat retainer blocks and a rear kick out block.
 - vii. BACK:
 - a. The back frame shall be covered with 100 point V-board and 2" polyurethane foam padding.
 - b. Plain back (smooth).
 - c. The sewn back cover shall have an addition sewn re-enforced double needle step that insures a durable seam that will not tear open.
 - viii. FOAM:
 - a. Polyurethane foam shall meet California Technical Bulletin #117 fire code.
 - b. Density shall be 1.4
 - c. Compression shall be 32# TB133 poly uretaner foam.
 - ix. BASE:
 - a. Base frame shall be southern yellow pine that will not swell or

delaminate (frame shall not be particle board or plywood)

- b. Provide nylon nail on glides to raise bench slightly off of the floor to re-position as needed by end user, as well as to keep it out of direct contact with the floor.
- c. Base shall be covered with black vinyl.
- x. **Upholstery & foam at the sides/ends of the wall bench shall be adjusted as required so that units can be ganged together without a gap.**
- xi. Fully enclosed black vinyl base
- xii. Standard Recessed Base



- xiii. FABRIC: Basis of Design manufacturer's standard option
 - a. Source: Manufacturer's Graded-in / Standard options (for Basis of Design Manufacturer, this would be "Culp Contract")
 - b. Pattern: Manufacturer's Graded-in / Standard options, solid/non-patterned (for Basis of Design Manufacturer, this would be pattern "Castillo")
 - c. Color: Manufacturer's Graded-in / Standard options (for Basis of Design Manufacturer, this would be color "Breezy" in pattern referenced above)
 - d. Content: 100% polyurethane
 - e. Backing: 87% polyester, 100% cotton
 - f. Finish: Anti-microbial and i-clean
 - g. Repeat: n/a
 - h. Weight: 18.6 oz / linear yard
 - i. Width: 54 inches
 - j. Abrasion: 200,000
 - k. Light fastness: Class 4 / 200 hr min (AATCC16A)
 - l. Color fastness: Class 4 (AATCC 8) Wet or Dry

- m. Flammability: NFPA 260 Class 1
- n. Cleanability: Soap & Water; Difficult stains: Fantastik or Formula 409
- o. Disinfects with 5:1 water/bleach solution

2.3 ACTION SUBMITTALS

- A. Samples for Verification: Shop Drawings
- B. Samples for Verification: Fabric
- C. Samples for Verification: Seaming Diagram

2.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Fabricator/Manufacturer.
- B. Qualification Data: For Installer.

2.5 PRODUCT SCHEDULE

2.6 ACCEPTABLE MANUFACTURERS / FABRICATORS:

- A. Shelby Williams (<https://www.shelbywilliams.com>) – basis of design
- B. Falcon Products (<https://www.falconproducts.com>)
- C. Martin Bratrud (<https://martinbratrud.com>)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. GC / GC'S INSTALLER TO NOTE SIZES AND COMPONENTS THAT COMPRISE EACH CONFIGURATION.
- B. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction. Test for proper operation and adjust until satisfactory results are

obtained.

- C. Anchor each unit to floor or wall.
- D. Gang wall benches together, with no gap.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. GC / GC'S INSTALLER SHALL REMOVE ALL TRASH & DEBRIS AT THE END OF EACH DAY. GC / GC'S INSTALLER IS RESPONSIBLE FOR PROTECTION OF FURNITURE FROM DAMAGE AT ALL TIMES.
- C. ANY DAMAGED FURNITURE SHALL BE IDENTIFIED AND DOCUMENTED, AND OWNER SHALL BE NOTIFIED. GC / GC'S INSTALLER IS RESPONSIBLE FOR LAYING FLOOR AND WALL PROTECTION IN PATH OF FURNITURE & CONTENTS REMOVAL AND DURING MOVES IN ALL AREAS NOT UNDER RENOVATION OR ALREADY INSTALLED.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 126400