New Mexico State University
Housing Renovations
Bid Package 2: Rhodes Garrett Hamiel Hall

Las Cruces, New Mexico

October 2018
PSC Project # 03891817
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Not Used

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DOCUMENT 00 31 26 - EXISTING HAZARDOUS MATERIAL INFORMATION

PART 1 - GENERAL

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for this Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. Related Requirements:
   1. Document 00 21 13 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
   2. Document 00 31 19 "Existing Condition Information" for information about existing conditions that is made available to bidders.
   3. Section 02 41 19 "Selective Demolition" for notification requirements if materials suspected of containing hazardous materials are encountered.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT
August 2, 2018

New Mexico State University
Attn: Ms. Nivia Franco
1780 E. University
Las Cruces NM, 88003

RE: Universal Waste Inspection at
RGH Hall
Las Cruces NM, 88003

Dear Ms. Franco,


The building was visually inspected for batteries, pesticides, mercury-containing equipment and bulb (lamps) as set forth in 40 CFR part 273. The results are as follows:

<table>
<thead>
<tr>
<th>PCB Ballasts</th>
<th>Batteries</th>
<th>Pesticides</th>
<th>Mercury Thermostats/Equip.</th>
<th>Mercury Bulbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Proper collection and disposal of these materials by trained personnel shall be adhered.

We appreciate the opportunity to be of service to you. Please contact us with questions or comments, or if we may be of further assistance.

Sincerely,

Nicolas Rodriguez
Project Manager
Asbestos Survey at
RGH Hall
New Mexico State University
Las Cruces, New Mexico 88003

Prepared for:
New Mexico State University
1780 E. University
Las Cruces, Las Cruces 88003

Prepared by:

AE Consulting, Inc.
1325 Arizona Ave.
El Paso, Texas 79902

Jose A. Moriel, Asbestos Building Inspector
TDSHS #60-3220, Expires 03/05/2019

Date of Inspection

July 23, 2018
August 2, 2018

New Mexico State University
Attn: Ms. Nivia Franco
1780 E. University
Las Cruces NM, 88003

RE: Asbestos Survey at
RGH Hall
Las Cruces NM, 88003

Dear Ms. Franco,


We appreciate the opportunity to be of service to you. Please contact us with questions or comments, or if we may be of further assistance.

Sincerely,

AnE Consulting, Inc.

Asbestos Consulting Agency
TDSHS License #10-0441, expires 02/01/2019

Jose A. Moriel
Asbestos Building Inspector
TDSHS #60-3220, Expires 03/05/2019

Enclosures: Asbestos Survey Report
Figures 1-6
Laboratory reports with chain of custody documentation
Texas asbestos licenses
Purpose
The structure is located at 1780 E. University Ave, Las Cruces, New Mexico. Ms. Nivia Franco of New Mexico State University, requested that AnE Consulting, Inc. (AnE) conduct a survey for asbestos-containing materials (ACMs). This survey is intended for the identification and locations of Asbestos Containing Materials and may be utilized for future renovation and demolition projects.

Subject Property Overview
It is unknown when the structure was built. The building structure consists of a bare concrete slab foundation, 9” floor tile, 12” floor Tile, carpet, textured drywall on walls, plaster on walls, 1’ x 1’ ceiling tile, 2’ x 4’ suspended ceiling tile, and popcorn ceiling texture. The exterior consists of plaster walls and flat roofing. The structure was occupied at the time of the survey.

Inspection
Field activities were conducted on July 30, 2018, by Mr. Jose A. Moriel, licensed by the Texas Department of State Health Services (TDSHS) as an Asbestos Building Inspector (license number 60-3220) with AnE Consulting Inc.

The survey was performed in general accordance with the National Emission Standards for Hazardous Air Pollutants (NESHAP) issued by the U.S. Environmental Protection Agency (40 CFR 61, Subpart M – National Emission Standard for Asbestos), the Asbestos Hazard Emergency Response Act (AHERA, 40 CFR 763), and the Asbestos School Hazard Abatement Reauthorization Act of 1990 (ASHARA, 40 CFR 763, Appendix C to Subpart E). These regulations generally require that, prior to any construction, renovation, or demolition, the area(s) where the work is to be performed shall be inspected by a properly trained and licensed or certified individual for the presence of ACMs that potentially may be disturbed during the work.

AnE employed a sampling strategy which involved identifying homogeneous materials throughout the proposed areas of work, and collecting bulk samples of the suspect materials for laboratory analysis for asbestos content. The term “homogeneous,” as defined by in AHERA, means any material having the same color and texture, and having been installed in the same general time period.

The structure contained twenty-eight (28) homogeneous areas that were identified during the course of this survey, from which fifty-nine (59) bulk samples were collected. Accessible areas of the building were visually inspected. Destructive sampling was not conducted for this survey. Hidden and inaccessible materials shall be assumed asbestos containing materials until tested. These identified homogenous materials are summarized in Table 1 that follows.
<table>
<thead>
<tr>
<th>Suspect ACM</th>
<th>Location(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9' Floor Tile with Black Mastic</td>
<td>South Hallway (Under Carpet)</td>
</tr>
<tr>
<td>Carpet with Mastic</td>
<td>Study Room &amp; Hallway</td>
</tr>
<tr>
<td>Grey Cove Base with Mastic</td>
<td>Study Room, Outside Rooms 255, &amp; 283</td>
</tr>
<tr>
<td>Black Staircase Thread with Mastic</td>
<td>Hallway</td>
</tr>
<tr>
<td>White Wall Plaster</td>
<td>South, North, &amp; Center Hallways</td>
</tr>
<tr>
<td>1' x 1' Ceiling Tile Mastic</td>
<td>South Hallway Rooms</td>
</tr>
<tr>
<td>Suspended Ceiling Tile</td>
<td>Throughout 2nd Floor Hallways</td>
</tr>
<tr>
<td>White Duct Mastic</td>
<td>Above Suspended Ceiling Tile</td>
</tr>
<tr>
<td>Carpet with Black Mastic</td>
<td>Outside Rooms 146, 131, &amp; 102</td>
</tr>
<tr>
<td>Pink Floor Tile with Mastic</td>
<td>Restrooms</td>
</tr>
<tr>
<td>Grey Cove Base with Mastic</td>
<td>Outside Rooms 147, 125, &amp; 103</td>
</tr>
<tr>
<td>Grey Stair Thread with Yellow Mastic</td>
<td>Main Stairway &amp; North Community Room</td>
</tr>
<tr>
<td>Tan Stair Thread with White Mastic</td>
<td>Tan Stair Thread with White Mastic</td>
</tr>
<tr>
<td>Black Cove Base with Yellow Mastic</td>
<td>Black Cove Base with Yellow Mastic</td>
</tr>
<tr>
<td>White Wall Plaster</td>
<td>North, South, &amp; Center Hallways</td>
</tr>
<tr>
<td>1' x 1' Ceiling Tile Mastic</td>
<td>South Hallway Rooms</td>
</tr>
<tr>
<td>2' x 4' Suspended Ceiling Tile</td>
<td>Outside Rooms 104, 121, &amp; Community Room</td>
</tr>
<tr>
<td>Ceiling Popcorn</td>
<td>Outside Room 151 (Center Hallway)</td>
</tr>
<tr>
<td>White Pipe Insulation</td>
<td>Center Hallway</td>
</tr>
<tr>
<td>Black Mastic</td>
<td>South Hallway</td>
</tr>
<tr>
<td>Basement Floor Tile with Mastic</td>
<td>Basement</td>
</tr>
<tr>
<td>Basement Ceiling Plaster</td>
<td>Basement</td>
</tr>
<tr>
<td>White Wall Plaster</td>
<td>Exterior</td>
</tr>
<tr>
<td>White Door Caulking</td>
<td>Exterior</td>
</tr>
<tr>
<td>White Window Glazing</td>
<td>Exterior</td>
</tr>
<tr>
<td>Black Roof Mastic</td>
<td>Exterior</td>
</tr>
<tr>
<td>Roof Black Membrane</td>
<td>Exterior</td>
</tr>
<tr>
<td>Red Asphalt Roof Paper</td>
<td>Exterior</td>
</tr>
</tbody>
</table>
The homogeneous material was then assessed in terms of friability, condition, and quantity. The term "friable" means a material that when dry can be reduced to a powder using hand pressure (25 TAC § 295.32 (45)). Prior to sampling, each suspect asbestos material was properly wetted, and then each bulk sample was carefully extracted and placed in its own self-sealing container. Each container was wiped, sealed, and labeled with a unique sample number. Appropriate chain of custody paperwork was completed listing each sample collected.

**Laboratory Analysis**

All samples were shipped under standard chain of custody protocols to Micro Analytical Services, Inc. (MAS) in Houston Texas. This facility is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis, and licensed by the TDSHS as an asbestos laboratory (license number 30-0341).

The bulk samples were analyzed by Polarized Light Microscopy (PLM) coupled with Dispersion Staining in accordance with EPA Method 600/M4-82-020. The laboratory report with chain of custody documentation is attached to this report.

An ACM is defined as any material or product that contains greater than one percent (1%) asbestos (25 TAC § 295.32 (15). Based on the laboratory data five (5) of the twenty-eight (28) identified homogenous materials were found to contain asbestos greater than one percent.

**Table 2 – Summary of Asbestos-Containing Materials**

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Asbestos Content</th>
<th>Condition / Friability</th>
</tr>
</thead>
<tbody>
<tr>
<td>9&quot; Floor Tile with Black Mastic</td>
<td>3 % Chrysotile</td>
<td>Fair/Non-Friable</td>
</tr>
<tr>
<td>Pink Floor Tile with Mastic</td>
<td>4 % Chrysotile</td>
<td>Fair/Friable</td>
</tr>
<tr>
<td>Ceiling Popcorn</td>
<td>6 % Chrysotile</td>
<td>Fair/Friable</td>
</tr>
<tr>
<td>Black Mastic</td>
<td>3 % Chrysotile</td>
<td>Fair/Non-Friable</td>
</tr>
<tr>
<td>White Wall Plaster</td>
<td>2 % Chrysotile</td>
<td>Fair/Non-Friable</td>
</tr>
</tbody>
</table>
Summary of Findings
The following is a summary of findings based on the field activities conducted and laboratory analyses performed.

- Asbestos-containing 9" floor tile with mastic was identified. The material was observed to be in fair condition and considered non-friable. The estimated quantity of the material is 23,000 sq. feet.

- Asbestos-containing pink floor tile with mastic was identified. The material was observed to be in fair condition and considered non-friable. The estimated quantity of the material is 55 sq. feet.

- Asbestos-containing of ceiling popcorn was identified. The material was observed to be in fair condition and considered friable. The estimated quantity of the material is 1,900 sq. feet.

- Asbestos-containing black mastic was identified. The material was observed to be in fair condition and considered non-friable. The estimated quantity of the material is 3,800 sq. feet.

- Asbestos-containing white wall plaster was identified. The material was observed to be in fair condition and considered non-friable. The estimated quantity of the material is 37,000 sq. feet.

- The Asbestos Containing Materials (ACM) quantities are estimations only, abatement contractor is responsible for field verification.

Recommendations
Based on the findings, AnE recommends the following:

- If the planned renovation or demolition activities will disturb the identified ACM, then the materials must be abated by a licensed/accredited abatement contractor in accordance with applicable Federal, State, and Local Rules and Regulations.

- A mandatory 10-day notification must be submitted in accordance with NESHAP for the planned abatement of the asbestos-containing materials. Written notification must be
postmarked at least 10 working days prior to the start of the abatement. Responsibility for proper notification is that of the building owner, which may be delegated to the asbestos abatement contractor or consultant by the owner.

- If during the renovation or demolition project other suspect asbestos-containing materials are encountered, then the work must be stopped and the suspect asbestos-containing material(s) should be tested for asbestos content.

**Qualifications and Limitations**

The discussions, findings, and recommendations contained herein are based upon data collected on the day of our investigation, the laboratory analysis of the samples collected, and typical practices accepted by the asbestos consulting profession. The scope of our work was limited to the subject areas and services stated in this report. Those building materials not inspected shall be assumed to contain asbestos unless laboratory analysis indicates otherwise.
## Polarized Light Microscopy Analysis

AnE Consulting, Inc.  
1325 Arizona  
El Paso, Texas 79902  

MAS Project #: 14192-00  
Date Received: 07/25/2018  
Date Analyzed: 07/26/2018  

**Project Name:** NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM

<table>
<thead>
<tr>
<th>Field ID/ Lab ID</th>
<th>Layer #</th>
<th>Sample Description</th>
<th>Asbestos Detected? (Yes/No)</th>
<th>Asbestos Constituents (%)</th>
<th>Non-Asbestos Constituents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH-01 MAS424802</td>
<td>1</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-01 MAS424802</td>
<td>2</td>
<td>Tan fibrous floor tile</td>
<td>Yes</td>
<td>3% Chrysotile</td>
<td>97% Other</td>
</tr>
<tr>
<td>RGH-01 MAS424802</td>
<td>3</td>
<td>Black non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-02 MAS424803</td>
<td>1</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-02 MAS424803</td>
<td>2</td>
<td>Tan fibrous floor tile</td>
<td>Yes</td>
<td>3% Chrysotile</td>
<td>97% Other</td>
</tr>
<tr>
<td>RGH-02 MAS424803</td>
<td>3</td>
<td>Black non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-03 MAS424804</td>
<td>1</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-03 MAS424804</td>
<td>2</td>
<td>Tan fibrous floor tile</td>
<td>Yes</td>
<td>3% Chrysotile</td>
<td>97% Other</td>
</tr>
<tr>
<td>RGH-03 MAS424804</td>
<td>3</td>
<td>Black non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-04 MAS424805</td>
<td>1</td>
<td>Brown/green/grey fibrous carpet</td>
<td>No</td>
<td></td>
<td>45% Synthetic 55% Other</td>
</tr>
<tr>
<td>RGH-04 MAS424805</td>
<td>2</td>
<td>Clear yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-05 MAS424806</td>
<td>1</td>
<td>Brown/green/grey fibrous carpet</td>
<td>No</td>
<td></td>
<td>45% Synthetic 55% Other</td>
</tr>
<tr>
<td>RGH-05 MAS424806</td>
<td>2</td>
<td>Clear yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-06 MAS424807</td>
<td>1</td>
<td>Brown/green/grey fibrous carpet</td>
<td>No</td>
<td></td>
<td>45% Synthetic 55% Other</td>
</tr>
</tbody>
</table>

Samples have been analyzed by the EPA Interim Method 600/M4-82-020(40CFR Part 763 Appendix E to Subpart E) & EPA 600/R-93/116. The test results herein relate only to the sample submitted and analyzed. This report may only be reproduced in full with the approval of the Bulk Asbestos Laboratory of Micro Analytical Services (MAS). The above percentages are visual estimates of area percent. MAS is not responsible for any errors resulting from improper or incorrect sampling or shipping procedures. These samples will be retained for a period of 30 days. Accreditation by NVLAP in no way constitutes or implies product certification, approval, or endorsement by NIST. Some materials, especially floor tiles, contain asbestos fibers too thin to be detected by this method.

NVLAP Lab Code: 200618  
TDSHS License: 30-0341

**Approved NVLAP Signatory:** Tony Dang

*Page 1 of 8*
# Polarized Light Microscopy Analysis

**Project Name:** NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM

<table>
<thead>
<tr>
<th>Field ID/ Lab ID</th>
<th>Layer #</th>
<th>Sample Description</th>
<th>Asbestos Detected? (Yes/No)</th>
<th>Asbestos Constituents (%)</th>
<th>Non-Asbestos Constituents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH-06</td>
<td>2</td>
<td>Clear yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>MAS424807</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-07</td>
<td>1</td>
<td>Brown non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>MAS424808</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-07</td>
<td>2</td>
<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>MAS424808</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-08</td>
<td>1</td>
<td>Brown non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>MAS424809</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-08</td>
<td>2</td>
<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>MAS424809</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-09</td>
<td>1</td>
<td>Brown non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>MAS424810</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-09</td>
<td>2</td>
<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>MAS424810</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-10</td>
<td>1</td>
<td>Black non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>MAS424811</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>RGH-10</td>
<td>2</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>MAS424811</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-11</td>
<td>1</td>
<td>Black non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>MAS424812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-11</td>
<td>2</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>MAS424812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-12</td>
<td>1</td>
<td>Beige non-fibrous plaster with beige paint</td>
<td>No</td>
<td>70% Aggregate</td>
<td>30% Other</td>
</tr>
<tr>
<td>MAS424813</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH-13</td>
<td>1</td>
<td>Beige non-fibrous plaster with beige paint</td>
<td>No</td>
<td>70% Aggregate</td>
<td>30% Other</td>
</tr>
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<td>MAS424814</td>
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<td></td>
</tr>
<tr>
<td>RGH-14</td>
<td>1</td>
<td>Beige non-fibrous plaster with beige paint</td>
<td>No</td>
<td>70% Aggregate</td>
<td>30% Other</td>
</tr>
<tr>
<td>MAS424815</td>
<td></td>
<td></td>
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</tr>
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</table>

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NVLAP Lab Code: 200618 TDSHS License: 30-0341

**Analyzed by:** Tony Dang

Approved NVLAP Signatory: Tony Dang

Page 2 of 8
# Polarized Light Microscopy Analysis

**AnE Consulting, Inc.**  
1325 Arizona  
El Paso, Texas 79902  

**Project Name:** NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM  

<table>
<thead>
<tr>
<th>Field ID/ Lab ID</th>
<th>Layer #</th>
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<th>Non-Asbestos Constituents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH-15 MAVS424816</td>
<td>1</td>
<td>Grey fibrous ceiling tile</td>
<td>No</td>
<td>10% Cellulose</td>
<td>90% fibrous Glass</td>
</tr>
<tr>
<td>RGH-15 MAVS424816</td>
<td>2</td>
<td>Dark brown non-fibrous mastic</td>
<td>No</td>
<td>100% Mastic</td>
<td></td>
</tr>
<tr>
<td>RGH-16 MAVS424817</td>
<td>1</td>
<td>Grey fibrous ceiling tile</td>
<td>No</td>
<td>10% Cellulose</td>
<td>90% fibrous Glass</td>
</tr>
<tr>
<td>RGH-16 MAVS424817</td>
<td>2</td>
<td>Dark brown non-fibrous mastic</td>
<td>No</td>
<td>100% Mastic</td>
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</tr>
<tr>
<td>RGH-17 MAVS424818</td>
<td>1</td>
<td>Grey fibrous ceiling tile</td>
<td>No</td>
<td>10% Cellulose</td>
<td>90% fibrous Glass</td>
</tr>
<tr>
<td>RGH-17 MAVS424818</td>
<td>2</td>
<td>Dark brown non-fibrous mastic</td>
<td>No</td>
<td>100% Mastic</td>
<td></td>
</tr>
<tr>
<td>RGH-18 MAVS424819</td>
<td>1</td>
<td>Beige fibrous ceiling tile with white paint</td>
<td>No</td>
<td>10% fibrous Glass</td>
<td>40% Cellulose 30% Perlite 20% Other</td>
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<tr>
<td>RGH-19 MAVS424820</td>
<td>1</td>
<td>Beige fibrous ceiling tile with white paint</td>
<td>No</td>
<td>10% fibrous Glass</td>
<td>40% Cellulose 30% Perlite 20% Other</td>
</tr>
<tr>
<td>RGH-20 MAVS424821</td>
<td>1</td>
<td>Beige fibrous ceiling tile with white paint</td>
<td>No</td>
<td>10% fibrous Glass</td>
<td>40% Cellulose 30% Perlite 20% Other</td>
</tr>
<tr>
<td>RGH-21 MAVS424822</td>
<td>1</td>
<td>White non-fibrous wrap</td>
<td>No</td>
<td>100% Plastic</td>
<td></td>
</tr>
<tr>
<td>RGH-21 MAVS424822</td>
<td>2</td>
<td>Yellow fibrous glass insulation</td>
<td>No</td>
<td>100% fibrous Glass</td>
<td></td>
</tr>
</tbody>
</table>

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**NVLAP Lab Code:** 200618  
**TDSH License:** 30-9341  
**Analyzed by:** Tony Dang  
**Approved NVLAP Signature:** Tony Dang  
Page 3 of 8
## Polarized Light Microscopy Analysis

AnE Consulting, Inc.
1325 Arizona
El Paso, Texas 79902

MAS Project #: 14192-00
Date Received: 07/25/2018
Date Analyzed: 07/26/2018

**Project Name:** NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM

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<tr>
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<th>Non-Asbestos Constituents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH-22 MAS424823</td>
<td>1</td>
<td>White non-fibrous wrap</td>
<td>No</td>
<td></td>
<td>100% Plastic</td>
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<tr>
<td>RGH-22 MAS424823</td>
<td>2</td>
<td>Yellow fibrous glass insulation</td>
<td>No</td>
<td></td>
<td>100% fibrous Glass</td>
</tr>
<tr>
<td>RGH-23 MAS424824</td>
<td>1</td>
<td>White non-fibrous wrap</td>
<td>No</td>
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<td>100% Plastic</td>
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<tr>
<td>RGH-23 MAS424824</td>
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<td>Yellow fibrous glass insulation</td>
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<td></td>
<td>100% fibrous Glass</td>
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<tr>
<td>RGH-24 MAS424825</td>
<td>1</td>
<td>Brown/green fibrous carpet</td>
<td>No</td>
<td></td>
<td>70% Synthetic 30% Other</td>
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<tr>
<td>RGH-24 MAS424825</td>
<td>2</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
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<td>100% Mastic</td>
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<tr>
<td>RGH-25 MAS424826</td>
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<td>Green/brown fibrous carpet</td>
<td>No</td>
<td></td>
<td>45% Synthetic 55% Other</td>
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<tr>
<td>RGH-25 MAS424826</td>
<td>2</td>
<td>Clear yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-26 MAS424827</td>
<td>1</td>
<td>Green/brown fibrous carpet</td>
<td>No</td>
<td></td>
<td>45% Synthetic 55% Other</td>
</tr>
<tr>
<td>RGH-26 MAS424827</td>
<td>2</td>
<td>Clear yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-27 MAS424828</td>
<td>1</td>
<td>Pink non-fibrous floor tile</td>
<td>No</td>
<td></td>
<td>100% Other</td>
</tr>
<tr>
<td>RGH-27 MAS424828</td>
<td>2</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-28 MAS424829</td>
<td>1</td>
<td>Pink non-fibrous floor tile</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-28 MAS424829</td>
<td>2</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
</tbody>
</table>

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NVLAP Lab Code: 200618   TDSSH License: 30-0341

**Analyzed by:** Tony Dang

**Approved NVLAP Signatory:** Tony Dang

Page 4 of 8
# Polarized Light Microscopy Analysis

**AnE Consulting, Inc.**  
1325 Arizona  
El Paso, Texas 79902  

**MAS Project #:** 14192-00  
**Date Received:** 07/25/2018  
**Date Analyzed:** 07/26/2018

**Project Name:** NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM

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<th>Non-Asbestos Constituents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH-28 MAS424829</td>
<td>3</td>
<td>Black fibrous mastic</td>
<td>Yes</td>
<td>4% Chrysotile</td>
<td>96% Mastic</td>
</tr>
<tr>
<td>RGH-29 MAS424830</td>
<td>1</td>
<td>Pink non-fibrous floor tile</td>
<td>No</td>
<td></td>
<td>100% Other</td>
</tr>
<tr>
<td>RGH-29 MAS424830</td>
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<td>Yellow non-fibrous mastic</td>
<td>No</td>
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<td>100% Mastic</td>
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<tr>
<td>RGH-29 MAS424830</td>
<td>3</td>
<td>Black fibrous mastic</td>
<td>Yes</td>
<td>4% Chrysotile</td>
<td>96% Mastic</td>
</tr>
<tr>
<td>RGH-30 MAS424831</td>
<td>1</td>
<td>Grey non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
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<tr>
<td>RGH-30 MAS424831</td>
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<td>Beige non-fibrous mastic</td>
<td>No</td>
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<td>100% Mastic</td>
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<tr>
<td>RGH-31 MAS424832</td>
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<td>Grey non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>RGH-31 MAS424832</td>
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<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-32 MAS424833</td>
<td>1</td>
<td>Grey non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>RGH-32 MAS424833</td>
<td>2</td>
<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-33 MAS424834</td>
<td>1</td>
<td>Tan non-fibrous stair thread</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>RGH-33 MAS424834</td>
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<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
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<td>RGH-34 MAS424835</td>
<td>1</td>
<td>Tan non-fibrous stair thread</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
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<tr>
<td>RGH-34 MAS424835</td>
<td>2</td>
<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
</tbody>
</table>

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**NVLAP Lab Code:** 200618  
**TDHS License:** 30-0341

**Analyzed by:** Tony Dang  
**Approved NVLAP Signatory:** Tony Dang

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## Polarized Light Microscopy Analysis

**Project Name**: NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM

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</tr>
</thead>
<tbody>
<tr>
<td>RGH-35, MAS424836</td>
<td>1</td>
<td>Tan non-fibrous stair thread</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>RGH-35, MAS424836</td>
<td>2</td>
<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-36, MAS424837</td>
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<td>Tan non-fibrous stair thread</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>RGH-36, MAS424837</td>
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<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-37, MAS424838</td>
<td>1</td>
<td>Black non-fibrous cove base</td>
<td>No</td>
<td></td>
<td>100% Vinyl</td>
</tr>
<tr>
<td>RGH-37, MAS424838</td>
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<td>Beige non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-38, MAS424839</td>
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<td>White non-fibrous plaster with brown paint</td>
<td>No</td>
<td></td>
<td>100% Other</td>
</tr>
<tr>
<td>RGH-38, MAS424839</td>
<td>2</td>
<td>Beige non-fibrous plaster</td>
<td>No</td>
<td>70% Aggregate</td>
<td>30% Other</td>
</tr>
<tr>
<td>RGH-39, MAS424840</td>
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<td>White non-fibrous plaster with brown paint</td>
<td>No</td>
<td></td>
<td>100% Other</td>
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<tr>
<td>RGH-39, MAS424840</td>
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<td>Beige non-fibrous plaster</td>
<td>No</td>
<td>70% Aggregate</td>
<td>30% Other</td>
</tr>
<tr>
<td>RGH-40, MAS424841</td>
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<td>100% Other</td>
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<tr>
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<td>No</td>
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<td>30% Other</td>
</tr>
<tr>
<td>RGH-41, MAS424842</td>
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<td>Grey fibrous ceiling tile</td>
<td>No</td>
<td>10% Cellulose</td>
<td>90% fibrous Glass</td>
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<tr>
<td>RGH-41, MAS424842</td>
<td>2</td>
<td>Dark brown non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
</tbody>
</table>

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NVLAP Lab Code: 200618  TDHS License: 30-0341

**Analyst**: Tony Dang

**Approved NVLAP Signatory**: Tony Dang
### Polarized Light Microscopy Analysis

**Project Name:** NMSU RGH Hall – 1780 E. University Ave. Las Cruces, NM

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<tbody>
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<td>RGH-42 MAS424843</td>
<td>1</td>
<td>Grey fibrous ceiling tile</td>
<td>No</td>
<td>10% Cellulose</td>
<td>90% fibrous Glass</td>
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<tr>
<td>RGH-42 MAS424843</td>
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<td>No</td>
<td>100% Mastic</td>
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<tr>
<td>RGH-43 MAS424844</td>
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<td>No</td>
<td>10% Cellulose</td>
<td>90% fibrous Glass</td>
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<tr>
<td>RGH-43 MAS424844</td>
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<td>Dark brown non-fibrous mastic</td>
<td>No</td>
<td>100% Mastic</td>
<td></td>
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<tr>
<td>RGH-44 MAS424845</td>
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<td>No</td>
<td>10% fibrous Glass</td>
<td>40% Cellulose</td>
</tr>
<tr>
<td>RGH-44 MAS424845</td>
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<td></td>
<td></td>
<td>30% Perlite</td>
</tr>
<tr>
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<td>40% Cellulose</td>
</tr>
<tr>
<td>RGH-45 MAS424846</td>
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<td></td>
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<td></td>
<td>30% Perlite</td>
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<tr>
<td>RGH-45 MAS424846</td>
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<td></td>
<td></td>
<td>20% Other</td>
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<tr>
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<td>No</td>
<td>10% fibrous Glass</td>
<td>40% Cellulose</td>
</tr>
<tr>
<td>RGH-46 MAS424847</td>
<td></td>
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</tr>
<tr>
<td>RGH-46 MAS424847</td>
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<td></td>
<td></td>
<td></td>
<td>20% Other</td>
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<tr>
<td>RGH-47 MAS424848</td>
<td>1</td>
<td>White fibrous popcorn texture</td>
<td>Yes</td>
<td>6% Chrysotile</td>
<td>94% Other</td>
</tr>
<tr>
<td>RGH-48 MAS424849</td>
<td>1</td>
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<td>Yes</td>
<td>6% Chrysotile</td>
<td>94% Other</td>
</tr>
<tr>
<td>RGH-49 MAS424850</td>
<td>1</td>
<td>White fibrous popcorn texture</td>
<td>Yes</td>
<td>6% Chrysotile</td>
<td>94% Other</td>
</tr>
<tr>
<td>RGH-50 MAS424851</td>
<td>1</td>
<td>White fibrous paper with foil backing</td>
<td>No</td>
<td>10% fibrous Glass</td>
<td>45% Cellulose</td>
</tr>
</tbody>
</table>

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NVLAP Lab Code: 230618  TDSHS License: 30-0341

**Analyzed by:** Tony Dang  
**Approved NVLAP Signatory:** Tony Dang

Page 7 of 8
## Polarized Light Microscopy Analysis

**Project Name:** NMSU RGH Hall - 1780 E. University Ave. Las Cruces, NM

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<tbody>
<tr>
<td>RGH-50 MAS424851</td>
<td>2</td>
<td>Yellow fibrous glass insulation</td>
<td>No</td>
<td></td>
<td>100% fibrous Glass</td>
</tr>
<tr>
<td>RGH-51 MAS424852</td>
<td>1</td>
<td>Yellow/black fibrous mastic</td>
<td>Yes</td>
<td>3% Chrysotile</td>
<td>97% Mastic</td>
</tr>
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<td>RGH-52 MAS424853</td>
<td>1</td>
<td>Beige non-fibrous floor tile</td>
<td>No</td>
<td></td>
<td>100% Other</td>
</tr>
<tr>
<td>RGH-52 MAS424853</td>
<td>2</td>
<td>Yellow non-fibrous mastic</td>
<td>No</td>
<td></td>
<td>100% Mastic</td>
</tr>
<tr>
<td>RGH-53 MAS424854</td>
<td>1</td>
<td>Grey non-fibrous plaster with beige paint</td>
<td>No</td>
<td></td>
<td>70% Aggregate 30% Other</td>
</tr>
<tr>
<td>RGH-54 MAS424855</td>
<td>1</td>
<td>Beige fibrous plaster with beige paint</td>
<td>Yes</td>
<td>2% Chrysotile</td>
<td>68% Aggregate 30% Other</td>
</tr>
<tr>
<td>RGH-54 MAS424855</td>
<td>2</td>
<td>Grey non-fibrous plaster</td>
<td>No</td>
<td></td>
<td>80% Aggregate 20% Other</td>
</tr>
<tr>
<td>RGH-55 MAS424856</td>
<td>1</td>
<td>White non-fibrous caulking</td>
<td>No</td>
<td></td>
<td>100% Other</td>
</tr>
<tr>
<td>RGH-56 MAS424857</td>
<td>1</td>
<td>Beige non-fibrous glaze with green paint</td>
<td>No</td>
<td></td>
<td>100% Other</td>
</tr>
<tr>
<td>RGH-57 MAS424858</td>
<td>1</td>
<td>Black fibrous roofing material</td>
<td>No</td>
<td></td>
<td>20% Cellulose 80% Mastic</td>
</tr>
<tr>
<td>RGH-58 MAS424859</td>
<td>1</td>
<td>Black non-fibrous roofing material</td>
<td>No</td>
<td></td>
<td>100% Rubber</td>
</tr>
<tr>
<td>RGH-59 MAS424860</td>
<td>1</td>
<td>Black fibrous roof shingle with pebbles</td>
<td>No</td>
<td></td>
<td>30% Aggregate 30% fibrous Glass 40% Tar</td>
</tr>
</tbody>
</table>

Samples have been analyzed by the EPA Interim Method 600/M4-82-020(40CFR Part 763 Appendix E to Subpart E) & EPA 600/R-93/116. The test results herein relate only to the sample submitted and analyzed. This report may only be reproduced in full with the approval of the Bulk Asbestos Laboratory of Micro Analytical Services (MAS). The above percentages are visual estimates of area percent. MAS is not responsible for any errors resulting from improper or incorrect sampling or shipping procedures. These samples will be retained for a period of 30 days. Accreditation by NVLAP in no way constitutes or implies product certification, approval, or endorsement by NIST. Some materials, especially floor tiles, contain asbestos fibers too thin to be detected by this method.

**NVLAP Lab Code:** 200618  **TDSHS License:** 30-0341

**Analyzed by:** Tony Dang  
**Approved NVLAP Signatory:** Tony Dang

Page 8 of 8
### Asbestos Bulk Sample Chain of Custody

**Company:** AnE Consulting, Inc.  
**Address:** 1325 Arizona  
**City:** El Paso  
**State/Zip:** Texas 79902  
**Phone:** (915) 532-3788  
**Fax:** (915) 532-3789  
**Bill to:** Nick Rodriguez  
**Email:** AnEconsulting@att.net  
**Project Name:** MASU RGH Hall  
**Date Collected:** 7/23/13  
**Project #:** MAS Project #: 14192

**Turn around time (circle):** Emergency 1-day 2-day 3-day 4-day 5-day

<table>
<thead>
<tr>
<th>Field ID</th>
<th>Lab ID</th>
<th>Sample Description</th>
<th>Sample Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH-01</td>
<td>424802</td>
<td>9&quot; Floor Tile w/ Mastic</td>
<td>Room 2G1 2nd Floor Under Carpet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-02</td>
<td>Mastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-04</td>
<td>Carpet w/ Mastic</td>
<td>Study Room Hallway</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-07</td>
<td>Gray Corrugated w/ Mastic</td>
<td>Room 255, 2 3rd Floor (outside)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-10</td>
<td>Black Storage Unused</td>
<td>Hallway</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-11</td>
<td>Mastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-12</td>
<td>Unit Wall Plaster</td>
<td>South, North &amp; Center</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-13</td>
<td></td>
<td>Hallway</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-15</td>
<td>Ceiling Tile Mastic</td>
<td>South Hallway</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-17</td>
<td>424818</td>
<td></td>
<td></td>
</tr>
</tbody>
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**Relinquished by:**  
**Date:**  
**Time:**

**Received by:**  
**Date:** 7/25/13  
**Time:** 9:21 AM

**Relinquished by:**  
**Date:**  
**Time:**

**Received by:**  
**Date:**  
**Time:**
Asbestos Bulk Sample Chain of Custody

<table>
<thead>
<tr>
<th>Field ID</th>
<th>Lab ID</th>
<th>Sample Description</th>
<th>Sample Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCH-18</td>
<td>424819</td>
<td>2x4 Ceiling Tile</td>
<td>Throughout 2nd Floor Hallways</td>
<td></td>
</tr>
<tr>
<td>-19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCH-21</td>
<td></td>
<td>White Parcel Master</td>
<td>Above Susp. (Ceiling Tile)</td>
<td></td>
</tr>
<tr>
<td>-22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCH-24</td>
<td>424836</td>
<td>Carpet w/ Black Rin 146, 175</td>
<td>1st Floor</td>
<td></td>
</tr>
<tr>
<td>-25</td>
<td>681527</td>
<td>Master in 102 Outside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCH-27</td>
<td></td>
<td>Brown Floor Tile w/ Master Restrooms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCH-30</td>
<td>424838</td>
<td>Grey Countertop w/ Master Rin 147, 175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-31</td>
<td>681525</td>
<td>Master in 102 Outside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCH-33</td>
<td></td>
<td>Grey Slat Throat w/ Master Slatway &amp;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-34</td>
<td></td>
<td>Master in Custody</td>
<td>6th Floor Custody</td>
<td></td>
</tr>
</tbody>
</table>

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Relinquished by:  [Signature]  Date:  [Date]  Time:  [Time]

Received by:  [Signature]  Date:  [Date]  Time:  [Time]
# Asbestos Bulk Sample Chain of Custody

<table>
<thead>
<tr>
<th>Field ID</th>
<th>Lab ID</th>
<th>Sample Description</th>
<th>Sample Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH - 3</td>
<td>204242</td>
<td>Tar Skim, Throttle &amp; Wash Holes</td>
<td>Cafeteria Community Rm. 1st Fl</td>
<td></td>
</tr>
<tr>
<td>RGH - 3</td>
<td>77</td>
<td>Black Core base &amp; Yellow Nails</td>
<td>Stair W/o V</td>
<td></td>
</tr>
<tr>
<td>RGH - 3</td>
<td>9</td>
<td>White Vell Plaster</td>
<td>North, South</td>
<td></td>
</tr>
<tr>
<td>RGH - 4</td>
<td>1</td>
<td>1st Ceiling Tile, Mould</td>
<td>South Hall</td>
<td></td>
</tr>
<tr>
<td>RGH - 4</td>
<td>4</td>
<td>1st Ceiling Tile Mould, South Hall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGH - 4</td>
<td>4</td>
<td>1 x 4&quot; Susp Ceiling</td>
<td>Outside Room</td>
<td></td>
</tr>
<tr>
<td>RGH - 4</td>
<td>7</td>
<td>Ceiling Popcorn</td>
<td>Outside Rm</td>
<td></td>
</tr>
<tr>
<td>RGH - 5</td>
<td>1</td>
<td>White Pipe Insulation</td>
<td>Hallway East</td>
<td></td>
</tr>
<tr>
<td>RGH - 5</td>
<td>1</td>
<td>Black Mastic</td>
<td>Hallway</td>
<td></td>
</tr>
</tbody>
</table>

Relinquished by: [Signature] Date: __________ Time: __________

Received by: [Signature] Date: 7/25/18 Time: 9:21 AM

Relinquished by: __________ Date: __________ Time: __________

Received by: __________ Date: __________ Time: __________
Asbestos Bulk Sample Chain of Custody

Company: AnE Consulting, Inc.  
Address: 1325 Arizona  
City: El Paso  
State/Zip: Texas 79902  
Phone: (915) 532-3788  
Fax: (915) 532-3789  
Bill to: Nick Rodriguez  
Email: AnEconsulting@att.net

Project Name: NM1u RCH Hll
PO #:  
Project #:  
Date Collected: 7/3/18  
MAS Project #: 14192

Turn around time (circle):  
- Emergency  
- 2-day  
- 3-day  
- 4-day  
- 5-day

<table>
<thead>
<tr>
<th>Field ID</th>
<th>Lab ID</th>
<th>Sample Description</th>
<th>Sample Location</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCH-52</td>
<td>424F53</td>
<td>bestos Floor Tiles</td>
<td>Basement</td>
<td></td>
</tr>
<tr>
<td>RCH-53</td>
<td></td>
<td>bestos Ceiling Dust</td>
<td>Basement</td>
<td></td>
</tr>
<tr>
<td>RCH-54</td>
<td></td>
<td>White Wall Plaster</td>
<td>Exterior</td>
<td></td>
</tr>
<tr>
<td>RCH-55</td>
<td></td>
<td>White Door Caulking</td>
<td>Exterior</td>
<td></td>
</tr>
<tr>
<td>RCH-56</td>
<td></td>
<td>White Window Glazing</td>
<td>Exterior</td>
<td></td>
</tr>
<tr>
<td>R1H-57</td>
<td></td>
<td>Black Rail Marker</td>
<td>Exterior</td>
<td></td>
</tr>
<tr>
<td>RCH-58</td>
<td></td>
<td>Red Block Membrane</td>
<td>Exterior</td>
<td></td>
</tr>
<tr>
<td>RCH-59</td>
<td>424F60</td>
<td>Red Asphalt roof</td>
<td>Exterior</td>
<td></td>
</tr>
</tbody>
</table>

Relinquished by:  
Date:  
Time:  

Received by:  
Date: 7/25/18  
Time: 9:21 AM

Relinquished by:  
Date:  
Time:  

Received by:  
Date:  
Time:  

Page 4 of 4
TEXAS DEPARTMENT OF STATE HEALTH SERVICES

ANE CONSULTING INC

is certified to perform as a

Asbestos Consultant Agency

in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

JOHN HELLERSTEDT, M.D.
COMMISSIONER OF HEALTH

License Number: 100441
Control Number: 96973

Expiration Date: 2/1/2019
(Void After Expiration Date)

VOID IF ALTERED   NON-TRANSFERABLE
TEXAS DEPARTMENT OF STATE HEALTH SERVICES

MICRO ANALYTICAL SERVICES INC

is certified to perform as a

Asbestos Laboratory
PCM, PLM

in the State of Texas within the purview of Texas Occupations Code, chapter 1954, so long as this license is not suspended or revoked and is renewed according to the rules adopted by the Texas Board of Health.

JOHN HELLERSTEDT, M.D.
COMMISSIONER OF HEALTH

License Number: 300341
Control Number: 96255
Expiration Date: 1/25/2020
(Void After Expiration Date)

VOID IF ALTERED   NON-TRANSFERABLE
Lead-Based Paint Survey at
RGH Hall
New Mexico State University
Las Cruces, New Mexico 88003

Prepared for:
New Mexico State University
1780 E. University Ave
Las Cruces, NM 88003

CONSULTING, INC.

1325 Arizona Ave.
El Paso Texas 79902

Inspection Date:
July 23, 2018
August 2, 2018

New Mexico State University
Attn: Ms. Nina Franco
1780 E. University Ave
Las Cruces, NM. 88003

RE: Lead-Based Paint Inspection
RGH Hall
New Mexico State University
Las Cruces, New Mexico 88003

Dear Ms. Franco,

AnE Consulting, Inc. is pleased to submit the following lead-based paint (LBP) report performed at the above referenced site. The survey was conducted on exterior painted surfaces.

The LBP survey was performed by Mr. Jose A. Moriel, a certified Texas Department of State Health Services Lead Inspector. The survey was conducted on July 23, 2018 utilizing a Niton XLP 300A Series X-Ray Fluorescence (XRF) with serial No. 89312.

We would like to thank you for the opportunity to help you with your environmental needs. If you have any questions please feel free to contact us.

Sincerely,

Jose A. Moriel
Lead Inspector
TX Cert. #2060921
Purpose and Scope of Services
AnE Consulting, Inc. submits the following results of the lead-based paint survey performed at 1780 E. University Ave., El Paso, Texas. The survey was conducted to determine if lead-based paint is present in the painted surfaces tested. The following report will explain the results of the survey. The specific work items that AnE agreed to provide are as follows:

1. Conduct on-site paint testing using a portable XRF instrument.
2. Collect basic information on paint conditions.
3. Prepare a report that describes our inspection process, summarizes the findings, and presents all data.

Lead-Based Paint is paint or other surface coatings that contain lead equal to or in excess of 1.0 milligram per square centimeter or more than 0.5 percent by weight or 5000 parts per million by weight as established by EPA and HUD regulations. **Seven (7) of the ninety (90) XRF results tested equal to or greater than the regulatory limit of 1.0 mg/cm² of lead.**

Building Description
It is unknown when the structure was built. The interior consists of a bare concrete slab foundation, ceramic floor tile, carpet, textured drywall walls, and 2’ x 4’ suspended ceiling tiles. The exterior consists of plaster on walls. The structure was vacant at the time of the survey.

Inspection Methodology
The survey was performed by Mr. Jose A. Moriel, a DSHS certified Lead Inspector on July 23, 2018. The building does not meet the US EPA and HUD definition of “Target Housing” or “Child Occupied Facility” and therefore is not subject to any regulations specific to LBP. However, the LBP inspections were generally conducted following the procedures outlined in Chapter 7 of the United States Housing Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint in Housing, revised October 1997.

After observation of the building materials which appear to have been repainted over the years there is no indication of any previous testing for lead-based paint. The physical condition of the building components and their paints were intact at the time of the survey. All interior and exterior homogenous painted surfaces were tested. The LBP survey was performed by Mr. Jose A. Moriel, a certified Texas Department of State Health Services Lead Inspector. The survey was conducted on July 23, 2018 utilizing a Niton XLP 300A Series X-Ray Fluorescence (XRF) with serial No. 89312, to measure the lead content of surface coatings on representative homogenous building components. A homogenous component is a building material that is uniform in function, composition, texture, age, and generally appears consistent at various locations at the building. The XRF instrument determines lead in all layers of paint. See the LBP Testing Data Sheet.
Although the protocol described in the HUD Guidelines for XRF instrument usage and selection of paint testing locations, the frequency/quantity of testing for any given individual building component may have been modified to reflect the nature of the subject project. Specifically it is important to note that the HUD Guidelines are not directly applicable to these types of buildings. Given that the building is not and will not be occupied by a child there is no need to specifically identify lead levels on each and every wall in each and every room. Rather the goal is to identify the lead ranges and paint conditions as relevant to the demolition work and the OSHA Lead Standard.

<table>
<thead>
<tr>
<th>Room</th>
<th>Colors</th>
<th>Substrate</th>
<th>Condition</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior</td>
<td>White, Grey, Green,</td>
<td>Drywall, Metal,</td>
<td>Fair</td>
<td>Wall, Door,</td>
</tr>
<tr>
<td></td>
<td>Varnish, Black, Beige,</td>
<td>Concrete, Ceramic</td>
<td></td>
<td>Door Frame, Rail,</td>
</tr>
<tr>
<td></td>
<td>Purple, Red, Tan, Brown &amp; Yellow</td>
<td>Tile, Wood &amp; Plaster</td>
<td></td>
<td>Pillar, Floor, Molding &amp; Window</td>
</tr>
<tr>
<td>Exterior</td>
<td>White, Purple, Red,</td>
<td>Plaster, Metal, CMU</td>
<td>Fair</td>
<td>Wall, Window,</td>
</tr>
<tr>
<td></td>
<td>Brown &amp; Green</td>
<td>&amp; Concrete</td>
<td></td>
<td>Door, Rail &amp; Stairs</td>
</tr>
</tbody>
</table>

**Calibration of the XRF Instrument**

Before proceeding with the survey of the painted surfaces, the XRF instrument performed a self-calibration check in accordance with the manufacturer’s quality control procedures. After the warm up period, the inspector took two calibration check readings on a 1.0 mg/cm² lead film provided by the manufacturer. The difference among the first calibration check average and the 1.0 mg/cm² lead film was not greater than the 0.2 mg/cm² calibration check limit obtained from the XRF Performance Characteristic Sheet, the XRF instrument in use did not require correction for substrate bias for any substrate encountered. No XRF readings above the upper limits of the inconclusive range were encountered. Because there were no inconclusive results, no paint chip samples were collected. At the end of the work shift, the inspector took a final set of two calibration check readings using the same procedure as the initial check.
Results
Lead-Based Paint is paint or other surface coatings that contain lead equal to or in excess of 1.0 milligram per square centimeter or more than 0.5 percent by weight or 5000 parts per million by weight as established by EPA and HUD regulations. Seven (7) of the ninety (90) XRF results tested equal to or greater than the regulatory limit of 1.0 mg/cm² of lead.

Table 2: Positive Results

<table>
<thead>
<tr>
<th>Field Sample No.</th>
<th>Test Location</th>
<th>Color</th>
<th>Substrate</th>
<th>Result</th>
<th>Pos./Neg.</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBP- 23</td>
<td>N. Hallway</td>
<td>Varnish</td>
<td>Wood</td>
<td>3.0</td>
<td>Positive</td>
<td>Fair</td>
</tr>
<tr>
<td>LBP- 44</td>
<td>Men's Shower Room</td>
<td>Pink</td>
<td>Ceramic Tile</td>
<td>8.2</td>
<td>Positive</td>
<td>Fair</td>
</tr>
<tr>
<td>LBP- 45</td>
<td>Men's Shower Room</td>
<td>Green</td>
<td>Ceramic Tile</td>
<td>7.7</td>
<td>Positive</td>
<td>Fair</td>
</tr>
<tr>
<td>LBP- 53</td>
<td>Women's Shower Room</td>
<td>Red</td>
<td>Ceramic Tile</td>
<td>22.1</td>
<td>Positive</td>
<td>Fair</td>
</tr>
<tr>
<td>LBP- 55</td>
<td>Women's Shower Room</td>
<td>Green</td>
<td>Ceramic Tile</td>
<td>10.1</td>
<td>Positive</td>
<td>Fair</td>
</tr>
<tr>
<td>LBP- 60</td>
<td>S. Women's Shower Room</td>
<td>Black</td>
<td>Ceramic Tile</td>
<td>17.3</td>
<td>Positive</td>
<td>Fair</td>
</tr>
<tr>
<td>LBP- 61</td>
<td>S. Women's Shower Room</td>
<td>Yellow</td>
<td>Ceramic Tile</td>
<td>1.9</td>
<td>Positive</td>
<td>Fair</td>
</tr>
</tbody>
</table>

AnE Consulting, Inc. has performed a lead based paint survey at RGH Hall, New Mexico State University, 1780 E. University Ave., El Paso, Texas. Lead-Based Paint is paint or other surface coatings that contain lead equal to or in excess of 1.0 milligram per square centimeter or more than 0.5 percent by weight or 5000 parts per million by weight as established by EPA and HUD regulations. Removal and disposal of lead based paint containing materials shall be done in accordance to federal, state and local rules and regulations. All personal handling lead based paint shall be licensed and trained. Care should also be taken with materials containing less than 1.0 mg/cm².
<table>
<thead>
<tr>
<th>No.</th>
<th>Date/Time</th>
<th>Type</th>
<th>Units</th>
<th>Sequence</th>
<th>Comp.</th>
<th>Substrate</th>
<th>Cond.</th>
<th>Color</th>
<th>Test Location</th>
<th>Results</th>
<th>Pbl</th>
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<tbody>
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<td>7/23/2018 12:58</td>
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TEXAS DEPARTMENT OF STATE HEALTH SERVICES

Be it known that

ANE CONSULTING INC

is certified to perform as a

Lead Firm

in the State of Texas and is hereby governed by the rights, privileges and responsibilities

set forth in Texas Occupations Code, Chapter 1955 and Title 25, Texas Administrative Code, Chapter 295

relating to Texas Environmental Lead Reduction, as long as this license is not suspended or revoked.

John Hellerstedt, M.D.
Commissioner of Health

License Number: 2110615
Control Number 6893

Expiration Date: 2/23/2019
(Void After Expiration Date)

VOID IF ALTERED     NON-TRANSFERABLE
SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project Information Management.
   2. Coordination.
   3. Preconstruction meeting.
   4. Request for information.
   5. Site mobilization meeting.
   6. Progress meetings.
   7. Preinstallation meetings.
   8. Cutting and patching.
   9. Alteration project procedures.

B. Related Sections:
   1. Other Division 01 Specification Sections apply to Work of this Section.

1.2 PROJECT INFORMATION MANAGEMENT

A. Project Website:
   1. Use Newforma Info Exchange; https://projects.team-psc.com/UserWeb/Login to send and receive project information.
   2. Contact Architect to setup a user name and password information.
   3. If this project is not listed when logged in, contact Architect to add this project to your account.

B. Project information includes, but is not limited to, the following:
   1. Product Submittals.
   2. Requests for Information (RFI).
   3. Applications for Payment.
   4. Schedules.
   5. Construction Change Requests (CCRs).
   7. Construction Document Files.
      a. Weather Days.
      b. Electronic File Requests.
      c. Correspondence.
      d. Test Reports.
      e. Meeting Minutes.
      f. Field Reports.

1.3 COORDINATION

A. Coordinate scheduling, submittals, and Work to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Large Apparatus: Any large apparatus which is to be installed in any space and is too large to permit access through windows, doorways, or shafts shall be provided before enclosing structure is completed.

F. Items which require electrical connections shall be coordinated with Division 26 Electrical for:
   1. Voltage.
   2. Phase.
   3. Ampacity.
   4. Number and size of wires.
   5. Wiring diagrams.
   6. Starter size, details, and location.
   7. Control devices and details.

G. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner’s occupancy.

H. After Owner occupancy of premises, coordinate access to site with Owner for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner’s activities.

1.4 PRECONSTRUCTION MEETING

A. Architect or Owner will schedule a meeting after Notice to Proceed.

B. Attendance Required:
   1. Owner.
   3. Contractor.
   4. Major subcontractors.

C. Agenda:
   1. Submission of executed bonds and insurance certificates.
   3. Submission of list of subcontractors, list of products, Schedule of Values, and progress schedule.
   5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, Request for Information (RFI), and Contract closeout procedures.
   6. Review Notice to Proceed (NTP) and Substantial Completion Dates.
   7. Workmen’s Identification and Background Checks.
   8. Surface drainage requirements (SWPPP).
   9. Scheduling:
      a. Use of premises by Owner and Contractor.
      b. Owner’s requirements and occupancy.
      c. Construction facilities and controls provided by Owner.
      d. Temporary utilities provided by Owner.
      e. Survey and building layout.
      f. Security and housekeeping procedures.
NMSU Housing Renovations - Bid Package 2

95% Construction Documents

g. Construction progress meetings.
h. Procedures for testing.
i. Procedures for maintaining record documents.
j. Requirements for start-up of equipment.
k. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within three days after meeting to participants with two copies to Architect and those affected by decisions made.

1.5 REQUEST FOR INFORMATION

A. Request for information (RFI) requests from subcontractors or material suppliers will not be considered.

B. Information indicated on RFI shall be complete before submission. If Architect determines that request can be answered with information provided, Architect will assign an RFI tracking number. Requests determined by Architect not to be an RFI will be returned to Contractor electronically and deleted from Architect's electronic tracking software without being assigned an RFI tracking number. A transmittal document returning the denied RFI request will be provided with a response indicating action to be taken by Contractor.

C. RFIs may contain more than one item when items are related issues. Otherwise, only one item shall be addressed on each RFI request.

D. Allow seven days for Architect's response to each RFI.

E. Response to RFI will be issued to Contractor and Owner per Section 01 33 00 "Submittal Procedures."

F. Responses from Architect are not changes unless issued with a change per Section 01 20 00 00 and Payment Procedure."

1.6 SITE MOBILIZATION MEETING

A. Schedule a meeting at site prior to Contractor occupancy.

B. Attendance Required: Architect, special consultants, Contractor, Contractor's superintendent, and major subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements and occupancy.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   7. Schedules.
   8. Procedures for testing.
   10. Requirements for start-up of equipment.
   11. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within three days after meeting to participants with copies to Architect and those affected by decisions made.
1.7 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of Work at minimum bi-monthly or weekly intervals as required by Architect.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
   1. Owner.
   2. Job superintendent.
   3. Major subcontractors.
   4. Suppliers.
   5. Architect.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
  10. Coordination of projected progress.
  11. Maintenance of quality and work standards.
  12. Effect of proposed changes on progress schedule and coordination.
  13. Other business relating to Work.

E. Record minutes, and distribute copies within 3 days to Architect, participants, and those affected by decisions made.

1.8 PREINSTALLATION MEETING

A. When required in individual specification Sections, convene a preinstallation meeting at site prior to installing Work.

B. Require attendance of parties directly affecting, or affected by, Work.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting.
   1. Review conditions of installation, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes, and distribute copies within 3 days after meeting to participants, with three copies to Architect.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Motors: Specific motor type is specified in individual specification sections.

B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
C. Cord and Plug: Provide minimum six foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
B. Verify that existing substrate is capable of structural attachment of new Work being applied or attached.
C. Examine and verify specific conditions described in individual specification sections.
D. Verify that utility services are available, of correct characteristics, and in correct location.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply any manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.
B. Submit request in advance of cutting or altering elements which affects:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   5. Work of Owner or separate contractor.
C. Execute cutting, fitting, and patching to complete Work, and to:
   1. Fit several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
D. Execute work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
E. Cut rigid materials using masonry saw or core drill.
F. Restore Work with new products in accordance with requirements of Contract Documents.
G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection. For an assembly, refinish entire unit.
J. Identify any hazardous substance or condition exposed during Work to Architect for decision or remedy.
3.4 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in product Sections; match existing products and work for patching and extending work.
B. Employ skilled and experienced installer to perform cutting and patching.
C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
D. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition unless otherwise specified.
E. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
F. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
G. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Architect for review.
H. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Architect review or request instructions from Architect.
I. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
J. Finish surfaces as specified in individual product Sections.

END OF SECTION
SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Preconstruction photographs.
   2. Periodic construction photographs.
   3. Final completion construction photographs.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 02 41 19 "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.2 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.
   1. Submit photos by uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
   2. Identification: Provide the following information with each image description in file metadata tag:
      a. Name of Project.
      b. Name and contact information for photographer.
      c. Name of Architect and Construction Manager.
      d. Name of Contractor.
      e. Date photograph was taken.
      f. Description of location, vantage point, and direction.
      g. Unique sequential identifier keyed to accompanying key plan.

1.3 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.4 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

C. Metadata: Record accurate date and time from camera.

D. File Names: Name media files with date, Project area and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.
B. General: Take photographs with maximum depth of field and in focus.
   1. Maintain key plan with each set of construction photographs that identifies each photographic location.
C. Preconstruction Photographs: Before commencement of demolition and starting construction, take photographs of Project construction areas and surrounding conditions, including existing items to remain during construction, from different vantage points, as directed by Construction Manager.
   1. For interior renovation work areas, take 20 photographs at each scoped area of work to show existing conditions and adjacent area conditions before starting the Work.
   2. For exterior renovation work areas, take 6 - 8 photographs at each existing building condition or window opening to accurately record physical conditions at start of construction.
D. Periodic Construction Photographs: Take 20 photographs weekly coinciding with the cutoff date associated with each Application for Payment and submit with each monthly payment application. Select similar vantage points to show status of construction and progress since last photographs were taken.
E. Final Completion Construction Photographs: Take 20 photographs after date of Substantial Completion for submission as Project Record Documents. Construction Manager will inform photographer of desired vantage points.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittal procedures.
   2. Resubmittal requirements.
   3. Construction progress schedules.
   4. Proposed products list.
   5. Shop drawings.
   6. Product data.
   7. Samples.
   8. Design data.
   9. Test reports.
   10. Certificates.
   11. Manufacturers’ instructions.
   12. Manufacturers’ field reports.
   13. Construction photographs.

B. Related Sections:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 20 00 "Price and Payment Procedures" for Schedule of Values; Inspecting and Testing Allowances.
   3. Section 01 30 00 "Administrative Requirements" for project information management.
   4. Section 01 40 00 "Quality Requirements" for Manufacturers' field services and reports; Testing Laboratory Services.
   5. Section 01 70 00 "Execution and Closeout Requirements" for Contract warranty, manufacturer's certificates and closeout submittals.

1.2 SUBMITTAL PROCEDURES

A. Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Produce copies and distribute in accordance with this Article.

C. Use project website to submit record documents as described in Section 01 70 00 "Execution and Closeout Requirements."

D. Transmit each submittal separately with Contractor's standard transmittal letter including Contractor's name, address, and phone number. Each submittal shall contain only one Specification Section.

E. Sequentially number transmittal forms using Section number or Contractors other sequential numbering system.

F. Identify Project, Contractor, subcontractor, or supplier; pertinent drawing sheet and detail number(s), and Specification Section number appropriate to submittal.

G. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with requirements of Work and Contract Documents.

H. Schedule submittals to expedite Project, and deliver to Architect. Coordinate submission of related items.
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95% Construction Documents

I. For each submittal for review, allow seven calendar days excluding delivery time to and from Contractor.

J. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work. Information, comments, field verifications, responses or other notations marked on submittals by Contractor shall be done in blue or green colors only.

K. Allow space on submittals for Contractor and Architect's review stamps.

L. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

M. Submittals not requested will not be recognized or processed.

N. Format:
   1. Submit all submittals digitally using .PDF file extension. Each submittal shall be a single .PDF file including transmittal letter. Multiple files for same submittal will not be accepted.
   2. Submittals in any other format, including .ZIP files, will be rejected.
   3. Hard copies will not be accepted.
   4. To ensure each page is legible, .PDF pages of drawings shall be same size/scale as a hard copy. Where applicable, scale symbols should be provided to indicate scale. Illegible submittals will be rejected.
   5. Uploaded submittals to project website.

O. Submittal procedures described in this Article applies to construction progress schedule, products list, shop drawings, product data, samples (actual samples and digital files of same), design data, test reports, certificates, manufacturer's instructions and field reports, erection drawings, and any other type of submittal submitted to Architect.

1.3 RESUBMITTAL REQUIREMENTS

A. Revise and resubmit submittals, as required, and resubmit to meet requirements as specified and as noted on submittal reviews.

B. Mark as RESUBMITTAL.

C. Re-use original transmittal number and supplement with sequential alphabetical or numeric suffix for each re-submittal.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule for Architect's review within 15 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedule with each Application for Payment, identifying changes since previous version.

D. Submit a horizontal bar chart with separate line for each section of Work, identifying first work day of each week.

E. Indicate product/material manufacturer's lead-time for delivery to site. Include as a separate line for each product/material.

F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of Work at each submission.

H. Dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes. Submit separate schedule of submittal dates for following:
   1. Shop drawings.
   2. Product data.
3. Samples.
4. Owner furnished products.
5. Products identified under Allowances.

I. Determine appropriate lead times to allow for manufacturing and delivery of products/material for incorporation into Work. Indicate product/material manufacturer’s lead-time for manufacturing and delivery to site. Include as a separate line for each product/material. Failure to timely submit and process submittals, and ordering of products/materials for delivery to site will not be grounds for approval of substitutions for other products/materials.

J. Indicate delivery dates for Owner furnished products and products identified under Allowances.

K. Revisions to Schedules:
   1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
   3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.5 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 SHOP DRAWINGS

A. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

B. Printable Image Size: Minimum 8-1/2 by 11 inches and maximum 30 by 42 inches.

C. Draw details to a minimum scale of 1/2 inches equal to 1 foot.

D. Draw site plans to same scale indicated on contract drawings.

E. Draw other plans to a minimum scale of 1/8 inch equal to 1 foot.

F. Construction Documents (electronic or paper format) issued by Architect cannot be used in any shape, form or fashion in creation and development of shop drawings, except that electronic files containing floor plans or site plans which have been purchased from Architect may be used as backgrounds for Contractor, subcontractors, sub-subcontractors, and material suppliers in shop drawing process.

G. Electronic Files:
   1. Electronic AutoCAD drawing files are available for purchase from Architect upon request. Cost of files are indicated below plus applicable taxes.
      a. 1 - 3 sheets $100.00 per sheet
      b. 4 - 6 sheets $400.00 flat fee
      c. 7 - 9 sheets $500.00 flat fee
   2. Contractor or his subcontractors and sub-subcontractors may purchase an electronic file. An electronic file will be provided in software release currently used by Architect. File will be provided via project website.
3. Electronic Revit model files are available for purchase from Architect upon request. Cost of model files are $150.00 each plus applicable taxes. Only Contractor or his subcontractors and sub-subcontractors may purchase an electronic file. An electronic file will be provided in software release currently used by Architect. File will be provided via project website.

4. Prior to delivery of file, purchaser shall sign an Electronic File Transfer Release Form. Payment for an electronic file shall occur upon delivery of file to purchaser.

5. Electronic file shall be used only for production of information required by this project and shall not be used in any other form (in whole or part).

6. In creation and publication of shop drawings, under no circumstances shall Design Professional's seal or title block of drawing be reproduced. Shop drawings must be original works from Contractor subcontractors, sub-subcontractors and material suppliers.

1.7 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

B. Include recommendations for application and use, and reference to compliance with specified standards of trade associations and testing agencies.

C. Include notation of special coordination requirements for interfacing with adjacent work and building utilities where applicable.

D. After review, distribute in accordance with Article titled SUBMITTAL PROCEDURES above and provide copies for Record Documents described in Section 01 70 00 "Execution and Closeout Requirements."

1.8 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of product, with integral parts and attachment devices. Accompany physical sample with color digital image (photo or scanned .PDF) of sample. Coordinate sample submittals for interfacing work.

B. Unless otherwise specified, submit samples of finishes from manufacturers' full range of standard colors, textures, and patterns, for Architect's selection.

C. Where variations in color, pattern or texture are inherent in material or product, submit multiple samples to indicate approximate range or variations.

D. Include full Project information and identification of manufacturer, model number, type, style and color on each sample.

E. Submit number of samples specified in individual Specification Sections; two of which will be retained by Architect.

F. Reviewed samples which may remain as part of Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in individual Specification Sections.

1.9 DESIGN DATA

A. Submit for Architect's knowledge as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
1.10 TEST REPORTS

A. Submit for Architect's knowledge as contract administrator or for Owner.
B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.11 CERTIFICATES

A. When specified in individual Specification Sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect.
B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

1.12 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
B. Identify conflicts between manufacturers' instructions and Contract Documents.
C. Indicate special procedures, conditions requiring special attention and special environmental criteria required for application or installation.

1.13 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect's benefit as contract administrator or for Owner.
B. Submit report within 30 days of observation to Architect for information.
C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.14 CONSTRUCTION PHOTOGRAPHS

A. Each month submit photographs to Architect with Application for Payment.
B. Photographs:
   1. Format: JPEG file extension; color.
   2. Subject:
      a. Take two site photographs from differing directions and five interior photographs indicating relative progress of Work, 5 days maximum prior to submitting pay request.
      b. Take photographs as evidence as required to document existing project conditions as follows:
         1) Interior views: Provide five images conveying progress from prior month for each facility being renovated.
   C. Identify photographs with date, time, orientation and project identification.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 35 16 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes special procedures for alteration work.
B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS
A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
B. Consolidate: To strengthen loose or deteriorated materials in place.
C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
D. 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.
E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
K. Retain: To keep existing items that are not to be removed or dismantled.
L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 COORDINATION
A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.
   1. Schedule construction operations in sequence required to obtain best Work results.
   2. Coordinate sequence of alteration work activities to accommodate the following:
      a. Owner's continuing occupancy of portions of existing building.
      b. Owner's partial occupancy of completed Work.
      c. Other known work in progress.
      d. Tests and inspections.
   3. Detail sequence of alteration work, with start and end dates.
4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
5. Use of elevator and stairs.

B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Access to restricted areas may not be obstructed. Plan and execute the Work accordingly.

1.4 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, Construction Manager will conduct conference at Project site.
1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, and Contractor, Construction Manager's critical subcontractor(s) shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
   a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Fire-prevention plan.
   c. Areas where existing construction is to remain and the required protection.
   d. Hauling routes.
   e. Sequence of alteration work operations.
   f. Storage, protection, and accounting for salvaged and specially fabricated items.
   g. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
   h. Qualifications of personnel assigned to alteration work and assigned duties.
   i. Requirements for extent and quality of work, tolerances, and required clearances.
3. Reporting: Construction Manager will record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, and Contractor, each installer, and other entities concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.
   a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
   b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
   c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
      1) Interface requirements of alteration work with other Project Work.
      2) Status of submittals for alteration work.
      3) Access to alteration work locations.
      4) Effectiveness of fire-prevention plan.
      5) Quality and work standards of alteration work.
      6) Change Orders for alteration work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.5 MATERIALS OWNERSHIP

   A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
   1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed.

1.6 INFORMATIONAL SUBMITTALS

   A. Alteration Work Subschedule:
      1. Submit alteration work subschedule within seven days of Notice to Proceed.
   B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

1.7 QUALITY ASSURANCE

   A. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
   B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.
C. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.

2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.

E. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.8 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.

2. Pack or crate items after cleaning; cushion against damage during handling. Label 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.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.

2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label 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 unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.

2. Secure stored materials to protect from theft.

3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 degrees F or more above the dew point.
E. Storage Space:
1. Owner will arrange for limited on-site location(s) for Construction Manager's storage of materials. It is the responsibility of the Construction Manager to manage the storage location, keep it clean and organized so as not to disrupt Owner daily activities. This storage location does not include security for stored material.

1.9 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs.
B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
C. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the Owner has removed or protected items not scoped for removal or demolition.
D. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection. (300 mm)

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
6. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
B. Temporary Protection of Materials to Remain:
1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
C. 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.
D. Utility and Communications Services:
   1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
   2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
   3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. 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 functioning properly.
   1. Prevent solids and liquids such as adhesives, paints and/or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
   2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:
   1. Comply with NFPA 241 requirements unless otherwise indicated.
   2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
      a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
   1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Use of open-flame equipment is not permitted in interior spaces. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
   2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
   3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
   4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
   5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
   6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
      a. Train each fire watch in the proper operation of fire-control equipment and alarms.
b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.

c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.

d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 45 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.

e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.

C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs. Comply with requirements in Section 01 32 33 "Submittal Procedures."

D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
   1. Do not proceed with the work in question until directed by Architect.

END OF SECTION
SECTION 01 35 91 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and treatment procedures for designated historic spaces, areas, rooms, and surfaces in Project.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.
B. Design Reference Sample: A sample that represents Architect's prebid selection of work to be matched; it may be existing work or work specially produced for Project.
C. Dismantle: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
D. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance that are important to the successful preservation and restoration as determined by Architect.
E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
G. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
H. Remove: To take down or detach a nonhistoric item located within a historic space, area, or room, using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
I. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
J. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
K. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
L. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
M. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
N. Retain: To keep existing items that are not to be removed or dismantled.
O. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.
P. Salvage: To protect removed or dismantled items and deliver them to Owner ready for reuse.
Q. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
R. Strip: To remove existing finish down to base material unless otherwise indicated.
1.3 COORDINATION

A. Historic Treatment Subschedule: A construction schedule coordinating the sequencing and scheduling of historic treatment work for entire Project, including each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces; and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for historic treatment work.

1. Schedule construction operations in sequence required to obtain best historic treatment results.

2. Coordinate sequence of historic treatment work activities to accommodate the following:
   a. Owner's continuing occupancy of portions of existing building.
   b. Owner's partial occupancy of completed Work.
   c. Other known work in progress.
   d. Tests and inspections.

3. Detail sequence of historic treatment work, with start and end dates.

4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.

5. Use of elevator and stairs.

6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

B. Pedestrian and Vehicular Circulation: Coordinate historic treatment work with circulation patterns within Project building(s) and site. Some work is near circulation patterns. Circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.4 PROJECT MEETINGS FOR HISTORIC TREATMENT

A. Preliminary Historic Treatment Conference: Before starting historic treatment work, Construction Manager will conduct conference at Project site.

1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, and Contractor, testing service representative, historic treatment specialists, chemical-cleaner manufacturer(s), and installers whose work interfaces with or affects historic treatment shall be represented at the meeting.

2. Agenda: Discuss items of significance that could affect progress of historic treatment work, including review of the following:
   a. Historic Treatment Subschedule: Discuss and finalize; verify availability of materials, historic treatment specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Fire-prevention plan.
   c. Governing regulations.
   d. Areas where existing construction is to remain and the required protection.
   e. Hauling routes.
   f. Sequence of historic treatment work operations.
   g. Storage, protection, and accounting for salvaged and specially fabricated items.
   h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
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i. Qualifications of personnel assigned to historic treatment work and assigned duties.

j. Requirements for extent and quality of work, tolerances, and required clearances.

k. Methods and procedures related to historic treatments, including product manufacturers’ written instructions and precautions regarding historic treatment procedures and their effects on materials, components, and vegetation.

l. Embedded work such as flashings and lintels, special details, collection of wastes, protection of occupants and the public, and condition of other construction that affect the Work or will affect the work.

3. Reporting: Construction Manager will record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct specifically for historic treatment work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, and Contractor, each historic treatment specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of historic treatment work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to historic treatment work.

2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of historic treatment work. Include topics for discussion as appropriate to status of Project.

   a. Historic Treatment Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.

   b. Schedule Updating: Revise Contractor's Historic Treatment Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

   c. Review present and future needs of each entity present, including review items listed in the "Preliminary Historic Treatment Conference" Paragraph in this article and the following:

      1) Interface requirements of historic treatment work with other Project Work.
      2) Status of submittals for historic treatment work.
      3) Access to historic treatment work.
      4) Effectiveness of fire-prevention plan.
      5) Quality and work standards of historic treatment work.
      6) Change Orders for historic treatment work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
1.5 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
   1. Dismantle and salvage each item or object and protect it from damage, then promptly deliver it to Owner where directed at Project site.
   2. Coordinate with Owner's historical adviser who will establish special procedures for dismantling and salvaging.

1.6 INFORMATIONAL SUBMITTALS

A. Historic Treatment Subschedule:
   1. Submit historic treatment subschedule within seven days of date established for commencement of historic treatment work.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.

C. Historic Treatment Program: Submit 7 days before work begins.

D. Fire-Prevention Plan: Submit 7 days before work begins.

1.7 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: An experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent to the work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
   1. Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on site when historic treatment work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond control of the specialist firm.
      a. Construct new mockups of required work whenever a supervisor is replaced.

B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.

C. Historic Treatment Program: Prepare a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail the materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project historic treatment program with specific requirements of programs required in other historic treatment Sections.
   1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
   2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.


1.8 STORAGE AND HANDLING OF HISTORIC MATERIALS

A. Salvaged Historic Materials:
   1. Clean loose dirt and debris from salvaged historic items unless more extensive cleaning is indicated.
   2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area on-site or as designated by Owner.
   5. Protect items from damage during transport and storage.

B. Historic Materials for Reinstallation:
   1. Repair and clean historic items for reuse as indicated.
   2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label 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 unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

D. Storage: Catalog and store historic items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
   1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
   2. Secure stored materials to protect from theft.
   3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 degrees F or more above the dew point.

E. Storage Space:
   1. Owner will arrange for limited on-site location(s) for free storage of historic material. This storage space does not include security and climate control for stored material.
   2. Arrange for off-site locations for storage and protection of historic material that cannot be stored and protected on-site.

1.9 FIELD CONDITIONS

A. Size Limitations in Historic Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.
PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.
1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where historic treatment work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during historic treatment work.
5. Contain dust and debris generated by historic treatment work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.

B. Temporary Protection of Historic Materials:
1. Protect existing historic materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.

C. 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.

D. Utility and Communications Services:
1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by historic treatment work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for historic treatment work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. 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 functioning properly.
1. Prevent solids such as stone or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
F. Existing Roofing: Prior to the start of work in an area, install roofing protection.

3.2 GENERAL HISTORIC TREATMENT

A. Have historic treatment work performed only by qualified historic treatment specialists.
B. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.
C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs video recordings. Comply with requirements in Section 01 32 33 "Photographic Documentation."
D. Perform daily inspections of Project site as the Work progresses to detect hazards resulting from historic treatment procedures.
E. Follow the procedures in subparagraphs below and procedures approved in historic treatment program unless otherwise indicated:
   1. Retain as much existing material as possible; repair and consolidate rather than replace.
   2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
   3. Use reversible processes wherever possible.
   4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
   5. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs. Comply with requirements in Section 01 32 33 "Photographic Documentation."
F. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
   1. Do not proceed with the work in question until directed by Architect.
G. Where missing features are indicated to be repaired or replaced, provide work with appearance based on accurate duplications rather than on conjecture, subject to approval of Architect.
H. Where work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.
I. Identify new and replacement materials and features with permanent marks hidden in the completed Work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.

3.3 HISTORIC TREATMENT SCHEDULE

A. Spaces, areas, rooms, and surfaces requiring special care and treatment to ensure successful preservation and restoration are indicated on Drawings and generally described below.
   1. <Insert location, applicable treatment, and zone or area designations>.

END OF SECTION
SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Quality control and control of installation.
   2. Tolerances.
   3. References.
   4. Mockup requirements.
   5. Manufacturers' field services.
   6. Examination.
   7. Preparation.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 30 00 "Administrative Requirements" for project information management.
   3. Section 01 33 00 "Submittal Procedures" for Submission of Manufacturers' Instructions and Certificates.
   4. Section 01 60 00 "Product Requirements" for Requirements for material and product quality.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
B. Comply with manufacturers' instructions, including each step in sequence.
C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
D. Comply with specified standards as a minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Perform work by persons qualified to produce workmanship of specified quality.
F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
C. Adjust products to appropriate dimensions; position before securing in place.
1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by Code.
C. Obtain copy of standards when required by specification section.
D. Neither contractual relationship, duties nor responsibilities of parties in Contract nor those of the Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.5 MOCKUP REQUIREMENTS

A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes.
C. Accepted mockups shall be comparison standard for quality level for Work.
D. Where mockup has been accepted by Architect and is specified in individual specification sections to be removed, remove mockup and clear area.

1.6 TESTING AND INSPECTION SERVICES

A. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect or Owner.
B. Submit independent testing laboratory firm’s reports to Architect. Reports to include observations and results of tests and will indicate compliance or non-compliance with Contract Documents.
C. Employment of independent testing agency or laboratory does not relieve Contractor from performing Work to contract requirements.
D. Re-testing and/or re-inspection required because of non-conformance to specified requirements will be charged to Contractor by deducting re-testing and/or re-inspection charges from Contract Sum/Price.

1.7 MANUFACTURERS’ FIELD SERVICES

A. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
B. Submit qualifications of observer to Architect 30 days in advance of required observations. Observer subject to approval of Architect.
C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers’ written instructions.
D. Refer to Section 01 33 00 "Submittal Procedures," Manufacturer's Field Reports Article.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
C. Examine and verify specific conditions described in individual specification sections.
D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION
SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
   8. ACI - American Concrete Institute; (Formerly: ACI International); www.aciinternational.org.
   10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
16. AIA - American Institute of Architects (The); www.aia.org.
26. ARRI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARRI - American Refrigeration Institute; (See AHRI).
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.cea.org.
52. CFPA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
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<thead>
<tr>
<th>Reference</th>
<th>Description</th>
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<tr>
<td>59. CPA</td>
<td>Composite Panel Association; <a href="http://www.pbmdf.com">www.pbmdf.com</a></td>
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<td>60. CRI</td>
<td>Carpet and Rug Institute (The); <a href="http://www.carpet-rug.org">www.carpet-rug.org</a></td>
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<tr>
<td>61. CRRC</td>
<td>Cool Roof Rating Council; <a href="http://www.coolroofs.org">www.coolroofs.org</a></td>
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<td>62. CRSI</td>
<td>Concrete Reinforcing Steel Institute; <a href="http://www.crsi.org">www.crsi.org</a></td>
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<tr>
<td>63. CSA</td>
<td>Canadian Standards Association; <a href="http://www.csa.ca">www.csa.ca</a></td>
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<td>64. CSA</td>
<td>CSA International; (Formerly: IAS - International Approval Services); <a href="http://www.csa-international.org">www.csa-international.org</a></td>
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<td>65. CSI</td>
<td>Construction Specifications Institute (The); <a href="http://www.csinet.org">www.csinet.org</a></td>
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<td>66. CSSB</td>
<td>Cedar Shake &amp; Shingle Bureau; <a href="http://www.cedarbureau.org">www.cedarbureau.org</a></td>
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<td>67. CTI</td>
<td>Cooling Technology Institute; (Formerly: Cooling Tower Institute); <a href="http://www.cti.org">www.cti.org</a></td>
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<td>68. CWC</td>
<td>Composite Wood Council; (See CPA)</td>
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<td>69. DASMA</td>
<td>Door and Access Systems Manufacturers Association; <a href="http://www.dasma.com">www.dasma.com</a></td>
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<td>70. DHI</td>
<td>Door and Hardware Institute; <a href="http://www.dhi.org">www.dhi.org</a></td>
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<td>71. ECA</td>
<td>Electronic Components Association; (See ECIA)</td>
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<td>72. ECAMA</td>
<td>Electronic Components Assemblies &amp; Materials Association; (See ECIA)</td>
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<td>73. ECIA</td>
<td>Electronic Components Industry Association; <a href="http://www.eciaonline.org">www.eciaonline.org</a></td>
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<td>74. EIA</td>
<td>Electronic Industries Alliance; (See TIA)</td>
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<td>75. EIMA</td>
<td>EIFS Industry Members Association; <a href="http://www.eima.com">www.eima.com</a></td>
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<td>76. EJMA</td>
<td>Expansion Joint Manufacturers Association, Inc.; <a href="http://www.ejma.org">www.ejma.org</a></td>
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<td>77. ESD</td>
<td>ESD Association; (Electrostatic Discharge Association); <a href="http://www.esda.org">www.esda.org</a></td>
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<td>78. ESTA</td>
<td>Entertainment Services and Technology Association; (See PLASA)</td>
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<td>79. EVO</td>
<td>Efficiency Valuation Organization; <a href="http://www.evo-world.org">www.evo-world.org</a></td>
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<td>80. FCI</td>
<td>Fluid Controls Institute; <a href="http://www.fluidcontrolsinstitute.org">www.fluidcontrolsinstitute.org</a></td>
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<td>81. FIBA</td>
<td>Federation Internationale de Basketball; (The International Basketball Federation); <a href="http://www.fiba.com">www.fiba.com</a></td>
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<td>82. FIVB</td>
<td>Federation Internationale de Volleyball; (The International Volleyball Federation); <a href="http://www.fivb.org">www.fivb.org</a></td>
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<td>83. FM Approvals</td>
<td>FM Approvals LLC; <a href="http://www.fmglobal.com">www.fmglobal.com</a></td>
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<td>84. FM Global</td>
<td>FM Global; (Formerly: FMG - FM Global); <a href="http://www.fmglobal.com">www.fmglobal.com</a></td>
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<td>85. FRSA</td>
<td>Florida Roofing, Sheet Metal &amp; Air Conditioning Contractors Association, Inc.; <a href="http://www.floridaroof.com">www.floridaroof.com</a></td>
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<td>86. FSA</td>
<td>Fluid Sealing Association; <a href="http://www.fluidsealing.com">www.fluidsealing.com</a></td>
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<td>87. FSC</td>
<td>Forest Stewardship Council U.S.; <a href="http://www.fscus.org">www.fscus.org</a></td>
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<td>88. GA</td>
<td>Gypsum Association; <a href="http://www.gypsum.org">www.gypsum.org</a></td>
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<td>89. GANA</td>
<td>Glass Association of North America; <a href="http://www.glasswebsite.com">www.glasswebsite.com</a></td>
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<tr>
<td>90. GS</td>
<td>Green Seal; <a href="http://www.greenseal.org">www.greenseal.org</a></td>
</tr>
<tr>
<td>91. HI</td>
<td>Hydraulic Institute; <a href="http://www.pumps.org">www.pumps.org</a></td>
</tr>
<tr>
<td>92. HI/GAMA</td>
<td>Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI)</td>
</tr>
<tr>
<td>93. HMMA</td>
<td>Hollow Metal Manufacturers Association; (See NAAMM)</td>
</tr>
<tr>
<td>94. HPVA</td>
<td>Hardwood Plywood &amp; Veneer Association; <a href="http://www.hpva.org">www.hpva.org</a></td>
</tr>
<tr>
<td>95. HPW</td>
<td>H. P. White Laboratory, Inc.; <a href="http://www.hpwhite.com">www.hpwhite.com</a></td>
</tr>
<tr>
<td>96. IAPSC</td>
<td>International Association of Professional Security Consultants; <a href="http://www.iapsc.org">www.iapsc.org</a></td>
</tr>
<tr>
<td>97. IAS</td>
<td>International Accreditation Service; <a href="http://www.iasonline.org">www.iasonline.org</a></td>
</tr>
<tr>
<td>98. IAS</td>
<td>International Approval Services; (See CSA)</td>
</tr>
<tr>
<td>99. ICBO</td>
<td>International Conference of Building Officials; (See ICC)</td>
</tr>
<tr>
<td>100. ICC</td>
<td>International Code Council; <a href="http://www.iccsafe.org">www.iccsafe.org</a></td>
</tr>
<tr>
<td>101. ICEA</td>
<td>Insulated Cable Engineers Association, Inc.; <a href="http://www.icea.net">www.icea.net</a></td>
</tr>
<tr>
<td>102. ICPA</td>
<td>International Cast Polymer Alliance; <a href="http://www.icpa-hq.org">www.icpa-hq.org</a></td>
</tr>
</tbody>
</table>
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
120. LMA - Laminating Materials Association; (See CPA).
123. MCA - Metal Construction Association; www.metalconstruction.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
139. NEBB - National Environmental Balancing Bureau; www.neebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.

REFERENCES 01 42 00 - 4
REFERENCES
01 42 00 - 5
REFERENCES

196. USAV - USA Volleyball; www.usavolleyball.org.
200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
201. WCMC - Window Covering Manufacturers Association; www.wcmanet.org.
204. WSRCA - Western States Roofing Contractors Association; www.wsrcba.com.
205. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
1. COE - Army Corps of Engineers; www.usace.army.mil.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eet.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.


2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.

3. DSCC - Defense Supply Center Columbus; (See FS).

4. FED-STD - Federal Standard; (See FS).


6. MILSPEC - Military Specification and Standards; (See DOD).

7. USAB - United States Access Board; www.access-board.gov.

8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Temporary Utilities:
      a. Electricity.
      b. Lighting.
      c. Heating.
      d. Cooling.
      e. Ventilation.
      f. Communication services.
      g. Water.
      h. Sanitary.
   2. Construction Facilities:
      a. Field offices and sheds.
      b. Parking.
      c. Progress cleaning.
      d. Traffic regulation.
   3. Temporary Controls:
      a. Noise control.
      b. Pest and rodent control.
      c. Pollution control.
      d. Protection of Work.

B. Related Requirements:
   1. Other Divisions 01 Specification Sections apply to Work of this Section.
   2. Section 01 70 00 "Execution and Closeout Requirements" for final cleaning.

1.2 TEMPORARY ELECTRICITY

A. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.
B. Owner will pay cost of energy used. Exercise measures to conserve energy.
C. Provide flexible power cords as required.
D. Permanent convenience receptacles may be utilized during construction.
E. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
   1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 2000 square feet of active work area and at specific locations as required.
   2. Provide 20 ampere, single phase branch circuits for lighting.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Existing building lighting may be utilized during construction. Owner will maintain lighting and pay cost of energy used. Exercise measures to conserve energy.
B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
C. Maintain lighting and provide routine repairs.
1.4 TEMPORARY HEAT

A. Utilize Owner's existing heat plant, extend and supplement with Contractor provided temporary heat devices as required to maintain specified conditions for construction operations.
B. Provide separate metering and for cost of energy used.
C. Enclose building prior to activating temporary heat in accordance with Exterior Enclosure Article in this section.
D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
E. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.5 TEMPORARY COOLING

A. Utilize Owner's existing cooling plant, extend and supplement with Contractor provided temporary cooling devices as required to maintain specified conditions for construction operations.
B. Provide separate metering and for cost of energy used.
C. Enclose building prior to activating temporary cooling in accordance with Enclosures article in this section.
D. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
E. Maintain maximum ambient temperature of 78 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.6 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
B. Provide temporary fan units as required to maintain clean air for construction operations.
C. Provide separate metering and for cost of energy used.

1.7 TEMPORARY COMMUNICATION SERVICES

A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.
B. Owner’s communication systems shall not be used unless otherwise approved by Owner.
C. As a minimum, provide cellular mobile telephone service for on-site superintendent and home office telephone service.

1.8 TEMPORARY WATER SERVICE

A. Connect to existing water source for construction operations. Extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.
B. Exercise measures to conserve water.
C. Provide temporary pipe insulation to prevent freezing.
1.9 TEMPORARY SANITARY FACILITIES

A. Existing facilities shall not be used.
B. At end of construction, return facilities to same or better condition than originally found.

1.10 FIELD OFFICES AND SHEDS

A. Do not use existing facilities for field offices or for storage.
B. Storage Areas and Sheds:
   1. Size storage to requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 60 00 "Product Requirements."
   2. Fire Extinguishers: Appropriate type fire extinguisher at each storage area.
   3. Interior Materials in Storage Sheds: As required to provide specified environmental conditions for storage of products.
   4. Heating and Ventilation: As required to maintain products in accordance with Manufacturer's requirements and Contract Documents.
   5. Lighting: As required for maintenance and inspection of products.
C. Installation:
   1. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
D. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.11 EMPLOYEE RESIDENTIAL OCCUPANCY

A. Not allowed on Owner's property.

1.12 PARKING

A. Use of designated existing on-site streets and driveways for construction traffic is permitted.
B. Use of designated areas of existing parking facilities by construction personnel is permitted.
C. Do not allow heavy or tracked vehicles or construction equipment in parking areas.
D. Permanent Pavements And Parking Facilities:
   1. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
   2. Use of permanent parking structures is permitted.
E. Maintenance:
   1. Maintain traffic and parking areas in sound condition.
   2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
F. Removal, Repair:
   1. Remove temporary materials and construction at Substantial Completion.
   2. Repair existing facilities damaged by use, to original condition.
G. Mud from Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.
1.13 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing space.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
D. Remove waste materials, debris, and rubbish from site and dispose off-site at intervals as required to maintain clean site.

1.14 TRAFFIC REGULATION

A. Signs, Signals, And Devices:
   1. Flaggerperson Equipment: As required by authority having jurisdiction.
B. Haul Routes:
   1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
   2. Confine construction traffic to designated haul routes.
   3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.
C. Traffic Signs And Signals:
   1. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
D. Removal:
   1. Remove equipment and devices when no longer required.
   2. Repair damage caused by installation.

1.15 NOISE CONTROL

A. Provide methods, means, and facilities to minimize disruption of Owner's operations and activities due to noise produced by construction operations.
B. Conduct activities that will produce noise that will or potentially will interfere with Owner's operations and activities at times agreed to by Owner.

1.16 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent the following from entering facility:
   1. Pests.
   2. Insects.
   3. Rodents.

1.17 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
B. Comply with pollution and environmental control requirements of authorities having jurisdiction.
1.18 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification Sections.
B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
C. Provide protective coverings at openings in walls, roof, and soffits.
D. Protect finished walkways, drives, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
F. Prohibit traffic from landscaped areas.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Products.
   2. Product delivery, storage and handling.
   3. Product options.
   4. Substitutions.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 30 00 "Administrative Requirements" for project information management.
   3. Section 01 40 00 "Quality Requirements" for product quality monitoring.
   4. Section 01 42 00 "References."

1.2 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming Work and does not include machinery and equipment used for preparation, fabrication, conveying and erection of Work. When allowed by Contract Documents, products may include used and/or existing materials or components.

B. Hazardous Materials: Products or material containing hazardous materials or substances, including but not limited to asbestos or polychlorinated biphenyl (PCB) shall not be included in Work.

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

D. Provide interchangeable components of same manufacturer, for similar components.

E. Materials required to match existing work and not otherwise specified, shall be equal to existing work in quality, color and finish. Workmanship and installation shall be comparable to adjacent existing work. Architect shall be authority in determination of acceptable work.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery:
   1. Deliver materials, products and equipment to site in manufacturer's original, unopened containers or packaging, with identifying labels intact and legible.
   2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
   3. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
   4. Arrange deliveries in accord with construction schedule and in ample time to facilitate inspection prior to installation to avoid unnecessary delays in construction process.

B. Storage:
   1. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
2. Store sensitive products in weather-tight, climate controlled enclosures.
3. For exterior storage of fabricated products, place on supports, above ground, sloped to drain water.
4. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Products.
6. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
7. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
8. Materials, products and equipment may be stored off site in a bonded and insured warehouse approved by Architect and Owner. Pay all costs incurred for off-site storage facilities. Products properly stored in off-site storage facilities may be included in progress pay requests with written approval of Architect.

C. Handling: Handle materials, products and equipment in a manner prescribed by manufacturer or specified to protect from damage during storage and installation.

1.4 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with this Section.

1.5 SUBSTITUTIONS

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this Section.
B. Substitutions (after bidding period) may be considered when a product becomes unavailable through no fault of Contractor.
C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
D. A request constitutes a representation that Bidder:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide same warranty for Substitution as for specified product.
   3. Will coordinate installation and make changes to other Work which may be required for Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
F. Substitution Submittal Procedure:
   1. Submit request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Requests shall include name of material or equipment to be substituted and a description of proposed substitution including drawings, performance and test data, and other information necessary for an evaluation.

3. Submit item by item (line by line) comparison of each item listed in specification compiled and submitted comparing specified material/product with proposed substitution.

4. Submit statement setting forth changes in other material, equipment or other portions of Work including changes in work of other contracts that incorporation of proposed substitution would require shall be included.

5. Submit shop drawings, product data, and certified test results for proposed product equivalence.

6. Architect will notify Contractor, in writing, of decision to accept or reject request.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closeout procedures.
   2. Final cleaning.
   3. Demonstration and instructions.
   4. Protecting installed construction.
   5. Hazardous materials affidavits.
   6. Project record documents.
   7. Operation and maintenance data.
  10. Spare parts and maintenance products.
  12. Maintenance service.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 30 00 "Administrative Requirements" for project information management.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's review.

B. Provide submittals to Architect required by authority having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Closeout documents will be submitted electronically in OCR (Optical Character Recognition)/PDF format.

E. At Owner’s request, Contractor shall provide a hard copy of Closeout Documents in 3-ring binders.

F. Owner will occupy portions of building as specified in Section 01 10 00 "Summary."

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Clean interior surfaces; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Replace filters of operating equipment due to dust generating work if required by Owner.

E. Remove waste and surplus materials, rubbish, and construction facilities from site.
1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.
B. Notify Architect and Owner seven days prior to start-up of each item.
C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
E. Verify wiring and support components for equipment are complete and tested.
F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
H. Submit a written report in accordance with Section 01 33 00 "Submittal Procedures" that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain aspects of operation and maintenance.
D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
F. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.
B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
E. Prohibit traffic from landscaped areas.

1.7 HAZARDOUS MATERIALS AFFIDAVITS

A. Provide notarized affidavits declaring that hazardous materials were not incorporated into or delivered to site.
NMSU Housing Renovations - Bid Package 2
95% Construction Documents

B. Hazardous materials include asbestos, lead polychlorinated biphenyl (PCB), prohibited
termite eradication chemicals or any substance of any proportion determined or suspected
by an agency of federal or state government to create a health hazard.

C. Provide table of contents listing affidavits in alphabetical order.

D. Prepare cover page with printed title “AFFIDAVITS OF NON-INCORPORATED
HAZARDOUS MATERIALS”, Title of Project, Project Address, Owner’s Name, Address
and Phone and date of Construction Completion.

E. Provide one complete set of aforementioned information in OCR (Optical Character
Recognition)/PDF format.

F. Submit prior to Application for Final Payment.

1.8 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of record documents; record actual revisions to Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
7. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of products
installed, including following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda, Change Orders, RFI responses, and other modifications.
   For Addenda, Change Orders, and RFI responses, cut out and tape to pages in
   appropriate location, referencing source of change.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual
construction including:
1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and
   appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction,
   referenced to visible and accessible features of Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.
6. Changes made by Addenda, Change Order, RFI responses, and other modifications.
   For Addenda, Change Orders, and RFI responses, cut out and tape to pages in
   appropriate location, referencing source of change.
7. Submit in OCR (Optical Character Recognition)/PDF format.
8. Submit MSDS on products used in construction of Project.
9. Submit MSDS electronically in 8-1/2 by 11 inch format text pages.
10. Prepare cover page with printed title “MATERIAL SAFETY DATA SHEETS
    (MSDS)”, Title of Project, Project Address, Owner’s Name, Address and Phone, and
    Date of Construction Completion.
11. Internally subdivide contents with page dividers, organized into CSI format shown
    in Project Manual.
12. Prepare a table of contents, listing each of Division headings and listing each material/product under each heading by manufacturer and material/product name.
13. Submit complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format.
14. Submit information with Application for Final Payment and include MSDS for materials/products delivered or installed in Project.
15. Failure to submit updated electronic MSDS documents will cause Application for Final Payment to be held by Architect (not submitted to Owner for processing) until such time updated electronic MSDS documents are received and reviewed for compliance by Architect.

G. Submit documents to Architect with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit data electronically in 8-1/2 by 11 inch text pages, OCR (Optical Character Recognition)/PDF format.
B. Prepare cover page with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project.
C. Internally subdivide contents with page dividers, logically organized as described below:
   1. Drawings: Provide in OCR (Optical Character Recognition)/PDF format
   2. Contents: Prepare Table of Contents for each file (if multiple files), with each product or system description identified, in three parts as follows:
      a. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
      b. Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify:
         1) Significant design criteria.
         2) List of equipment.
         3) Parts list for each component.
         4) Operating instructions.
         5) Maintenance instructions for equipment and systems.
         6) Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
      c. Part 3: Project documents and certificates, including:
         1) Shop drawings and product data.
         2) Air and water balance reports.
         3) Certificates.
         4) Scanned copies of warranties and bonds IN OCR (Optical Character Recognition)/PDF format.
D. Submit one complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format.
E. Submit documents with Application for Final Payment.

1.10 MANUAL FOR MATERIALS AND FINISHES

A. Submit in OCR (Optical Character Recognition)/PDF format of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return electronic file with comments.
B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
Submit one electronic copy of completed volumes 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Architect comments. Revise content of electronic document set as required prior to final submission.

Submit electronic documents of revised final volumes in final form within 10 days after final inspection.

Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.

Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.


Additional Requirements: As specified in individual product specification sections.

Include listing in Table of Contents for design data, with fly sheet.

MANUAL FOR EQUIPMENT AND SYSTEMS

Submit in OCR (Optical Character Recognition)/PDF format of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return with comments.

For equipment, or component parts of equipment put into service during construction and operated by Owner, submit electronic documents within ten days after acceptance.

Submit electronic copy of completed volume(s) 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Architect comments. Revise content of electronic document set as required prior to final submission.

Submit electronic documents in OCR (Optical Character Recognition)/PDF format of revised final volumes in final form within 10 days after final inspection.

Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.

Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

Include servicing and lubrication schedule, and list of lubricants required.

Include manufacturer's printed operation and maintenance instructions.

Include sequence of operation by controls manufacturer.

Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

Include control diagrams by controls manufacturer as installed.

Include Contractor's coordination drawings, with color coded piping diagrams as installed.

Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

Include test and balancing reports as specified in Section 01 40 00 "Quality Requirements."

Additional Requirements: As specified in individual product specification sections.
R. Include listing in Table of Contents for design data, with dividers.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.
C. Submit receipts signed by Owner or letter stating Contractor has delivered extra products to Owner.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
C. Verify documents are in proper form, contain full information, and are notarized.
D. Co-execute submittals when required.
E. Include Table of Contents.
F. Submit one complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format for review.
G. Submit prior to Application for Final Payment.
H. Time Of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operation and maintenance documentation directory manuals.
   2. Emergency manuals.
   3. Systems and equipment operation manuals.
   4. Systems and equipment maintenance manuals.
   5. Product maintenance manuals.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.2 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:
   1. Submit on digital media acceptable to Architect through Newforma. Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
   1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

E. Comply with Section 01 70 00 "Execution and Closeout Requirements" for schedule for submitting operation and maintenance documentation.
1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
   1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
   2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
   1. Title page.
   2. Table of contents.
B. Title Page: Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name and contact information for Contractor.
   6. Name and contact information for Construction Manager.
   7. Name and contact information for Architect.
   8. Name and contact information for Commissioning Authority.
   9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
   10. Cross-reference to related systems in other operation and maintenance manuals.
C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
   1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."
1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
   1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
   2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
   2. Performance and design criteria if Contractor has delegated design responsibility.
   3. Operating standards.
   4. Operating procedures.
   5. Operating logs.
   6. Wiring diagrams.
   7. Control diagrams.
   8. Piped system diagrams.
   9. Precautions against improper use.
   10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:
   1. Product name and model number. Use designations for products indicated on Contract Documents.
   2. Manufacturer's name.
   3. Equipment identification with serial number of each component.
   4. Equipment function.
   5. Operating characteristics.
   6. Limiting conditions.
   7. Performance curves.
   8. Engineering data and tests.
   9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:
   1. Startup procedures.
   2. Equipment or system break-in procedures.
   3. Routine and normal operating instructions.
   4. Regulation and control procedures.
   5. Instructions on stopping.
   7. Seasonal and weekend operating instructions.
   8. Required sequences for electric or electronic systems.
   9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.
1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
   a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers’ forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers’ printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
   1. Do not use original project record documents as part of maintenance manuals.

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:
   1. Product name and model number.
   2. Manufacturer's name.
   3. Color, pattern, and texture.
   5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures.
   2. Types of cleaning agents to be used and methods of cleaning.
   3. List of cleaning agents and methods of cleaning detrimental to product.
   4. Schedule for routine cleaning and maintenance.
   5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 10 00 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

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

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

   1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property. Indicate proposed locations and construction of barriers.
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95% Construction Documents

B. 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 and other tenants' 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.

C. 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.

D. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

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

1.8 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.
C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.
F. 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.
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/ASSE 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. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings.
   1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
   2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
   1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated 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.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.
3.3 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, to minimize disturbance of adjacent surfaces. 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 adequate ventilation when using cutting torches.
   6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   9. Dispose of demolished items and materials promptly.

B. 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.

C. 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.

D. 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.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   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.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 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.

3.7 SELECTIVE DEMOLITION SCHEDULE

A. Existing Items to Be Removed: Include but not limited to flooring (carpet, VCT and/or LVT and tile), base (resilient and/or wood), light fixtures and ceiling systems as defined by the Owner upon field walk and confirmation.

B. Existing Items to Be Removed and Reinstalled: Plumbing fixtures at locations to receive Miracle Method application over existing tile.

END OF SECTION
SECTION 02 42 96 - HISTORIC REMOVAL AND DISMANTLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment procedures in the form of special types of selective demolition work for designated historic spaces, areas, rooms, and surfaces and the following specific work:
   1. Removal and dismantling of indicated portions of building or structure and debris hauling.
   2. Removal and dismantling of indicated site elements and debris hauling.
   3. Salvage of existing items to be reused or recycled.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 35 91 "Historic Treatment Procedures" for general historic treatment requirements.

1.2 DEFINITIONS

A. Dismantle: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

B. Existing to Remain: Existing items that are not to be removed or dismantled, except to the degree indicated for performing required Work.

C. Remove: To take down or detach a nonhistoric item located within a historic space, area, or room, using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

D. Retain: To keep existing items that are not to be removed or dismantled.

E. Salvage: To protect removed or dismantled items and deliver them to Owner ready for reuse.

1.3 PRECONSTRUCTION MEETINGS

A. Preconstruction Conference(s): Conduct conference(s) at Project site.
   1. Review list of items indicated to be salvaged.
   2. Verify qualifications of personnel assigned to perform removal and dismantling.
   3. Inspect and discuss condition of each construction type to be removed or dismantled.
   4. Review requirements of other work that depends on condition of substrates exposed by removal and dismantling work.
   5. Review methods and procedures related to removal and dismantling work, including, but not limited to, the following:
      a. Historic removal and dismantling specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required clearances.
      c. Fire prevention.
      d. Coordination with building occupants.
1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For historic removal and dismantling specialist and historic removal and dismantling specialist's field supervisors.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's removal and dismantling operations.

C. Removal and Dismantling Historic Treatment Program: Submit 30 days before work begins.

D. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.
   1. Include item description, item condition, number of items if more than one of a type, and tag number. Include photo of item in original location.
   2. As work proceeds, include on the inventory items that were indicated to be salvaged and items of historic importance discovered during the work. Document reasons, if any, why an item indicated to be salvaged was not salvaged.

1.5 QUALITY ASSURANCE

A. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is insufficient experience for historic removal and dismantling work.

B. Removal and Dismantling Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of removal and dismantling work, including protection of surrounding and substrate materials and Project site.
   1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
   2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

C. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Construction Manager before start of the Work.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Construction Manager will remove hazardous materials under a separate contract.
   a. In the case of asbestos, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Reassign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.

D. Hazardous Materials: Hazardous materials are present in construction affected by removal and dismantling work. A report on the presence of hazardous materials is provided in this Project Manual and is also on file for review and use with the Owner. Examine report to become aware of locations where hazardous materials are present.
   1. Hazardous material remediation is specified elsewhere in the Contract Documents.
   2. Do not disturb hazardous materials or items suspected of containing hazardous materials, except under procedures specified elsewhere in the Contract Documents.
   3. If unanticipated asbestos is suspected, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Reassign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.

E. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC TREATMENT SPECIALISTS
   A. Historic Removal and Dismantling Specialist Firms: Subject to compliance with requirements, have historic removal and dismantling performed by a company specializing in the scoped work. Firms are required to have a minimum 5 years demonstrated history in performing similar work and must be pre-approved by the Architect and Owner.

3.2 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT
   A. Removal Equipment: Use only hand-held tools, except as follows or unless otherwise approved by Architect on a case-by-case basis:
      1. Light jackhammers are allowed subject to Architect's approval for tile removal.
      2. Large air hammers are not permitted.
   B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Architect on a case-by-case basis:
      1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
      2. Pry bars more than 18 inches long and hammers weighing more than 2 pounds are not permitted for dismantling work.
3.3 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures are necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.

1. Verify that affected utilities are disconnected and capped.
2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage. Enter this information on the submittal of inventory of salvaged items.
3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

C. Perform surveys as the Work progresses to detect hazards resulting from historic removal and dismantling procedures.

3.4 HISTORIC REMOVAL AND DISMANTLING

A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.

B. Perform work according to the historic treatment program.
1. Perform removal and dismantling to the limits indicated.
2. Provide supports or reinforcement for existing construction that becomes temporarily weakened by removal and dismantling work, until the Project Work is completed unless otherwise indicated.
3. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
4. Do not operate air compressors inside building unless approved by Architect in each case.
5. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
6. Dispose of removed and dismantled items off-site unless indicated to be salvaged or reinstalled.

C. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment according to the historic treatment program to ensure that such water does not create a hazard or adversely affect other building areas or materials.

D. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.
E. Removing and Dismantling Items on or Near Historic Surfaces:
   1. Use only dismantling equipment and procedures within 12 inches of historic surface.
      Do not use pry bars. Protect historic surface from contact with or damage by tools.
   2. Unfasten items in the opposite order from which they were installed.
   3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
   4. Dismantle anchorages.
F. Loose Plaster: Identify loose, nonhistoric plaster, and separate it from its substrate by tapping with a hammer and prying with a chisel or screwdriver. Do not use pry bars. Leave sound, firmly adhered plaster in place. Do not damage, remove, or dismantle historic plasterwork, except where indicated or where it is an immediate hazard to personnel and as approved by Architect.
G. Anchorages:
   1. Remove anchorages associated with removed items.
   2. Dismantle anchorages associated with dismantled items.
   3. In nonhistoric surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.
   4. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section that is specific to the historic surface being patched.

END OF SECTION
SECTION 05 03 72 - HISTORIC DECORATIVE METAL REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment of decorative metal in the form of repair as follows:
   1. Repairing metals other than cast iron and replacing damaged and missing components in place.
   2. Removing and dismantling metal for shop repair and replacement of components; reinstalling repaired metal.
   3. Painting steel uncovered during the Work.
   4. Installing wood rails supported by or attached to decorative metal railings or brackets.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 35 91 "Historic Treatment Procedures" for general historic treatment requirements.

1.2 ALLOWANCES

A. Allowances for historic treatment of decorative metals are specified in Section 01 21 00 "Allowances."
   1. Perform historic treatment of decorative metals under quantity allowances and only as authorized. Authorized work includes work required by Drawings and Specifications and work as directed in writing by Architect.
   2. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.
   3. Perform work that exceeds quantity allowances only as authorized by Change Orders.

B. Repairing decorative ornamental wrought iron guard railings and supports is part of the campanile tower feature at Garrett Hall main entrance, named Campanile Tower Repairs.

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
B. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.
C. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of decorative metal.
   2. Review methods and procedures related to historic decorative metal repair including, but not limited to, the following:
      a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required clearances.
1.5 SEQUENCING AND SCHEDULING

A. Perform decorative metal repair in the following sequence, which includes work specified in this and other Sections:
1. Verify that temporary protections have been installed.
2. Examine condition of decorative metal and determine if reuse of existing metal components is feasible.
3. Clean decorative metal surface, and remove paint and other finishes to the extent required for reattachment by welding.
4. Repair and replace existing decorative metal and supports to the degree required for a uniform and sound surface on which to paint or apply other finishes.
5. Reinstalled damaged, bent, detached or otherwise disconnected metal decorative metal components to existing building such as to re-establish the original design intent of the decorative metal element.
6. Clean, prime, paint and apply other finishes.
7. Reinstall decorative metal components by welding metal to existing building, provide supplemental metal plates to restore design intent as required.
8. Restore pantina finish to match adjacent decorative metal elements.

1.6 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.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For historic treatment specialist.
B. Evaluation Reports: For post-installed structural anchors, from ICC-ES.
C. Decorative Metal Historic Treatment Program: For repairing historic decorative metalwork.

1.8 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic decorative metal repair specialist. Repair specialist shall be experienced in forge welding. Experience in torch- or arc-welding and installing and finishing new decorative metal work is insufficient experience for decorative metal historic treatment work.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with historic treatment of decorative metal only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, anchors according to structural performance requirements.

B. Structural Performance: Railings brackets, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Uniform load of 50 lbf/ft. applied in any direction.
   2. Concentrated load of 200 lbf applied in any direction.
   3. Uniform and concentrated loads need not be assumed to act concurrently.

2.2 METAL MATERIALS

A. Provide metal materials made of the alloys, forms, and types that match existing metals and have the ability to receive finishes matching existing finishes unless otherwise indicated. Exposed-to-view surfaces exhibiting imperfections inconsistent with existing materials are unacceptable.

B. Source Limitation for Replacement Cast Materials: Obtain castings for historic treatment of decorative metal from single source from single manufacturer with resources to provide materials of consistent quality in appearance and physical properties.

C. Wrought Iron: Pure iron with not more than 0.035 percent carbon and containing fibrous slag (iron silicate) Pure iron with not more than 0.035 percent carbon and no slag (iron silicate) or mild steel; ASTM A 29/A 29M, Grade 1010; hand worked or machine forged to the form indicated.

2.3 PREPARATORY CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gallon of solution required.

D. Abrasive Materials:
   1. Abrasive Pads: Non-scratch, of the following type(s):
      a. Abrasive Pad with Sponge: Combination plastic abrasive pad, consisting of a sponge enclosed with a woven urethane, polypropylene, or other plastic mesh or fabric, without other abrasive components that can scratch metal.

E. Wash Cloths: Lint-free, absorbent, durable cloth without abrasives that can scratch metal.

F. Rust Remover: Manufacturer's standard phosphoric acid-based gel formulation, also called "naval jelly," for removing corrosion from iron and steel.
2.4 ACCESSORIES

A. Welding Electrodes and Filler Metal: Select according to AWS specifications for metal alloy welded; use metal type and alloy as required for color match, strength, and compatibility in fabricated items.


C. Masking Tape: Nonstaining, nonabsorbent material; compatible with chemical solutions being used and substrate surfaces, and that will easily come off entirely, including adhesive.

D. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:
   1. Previous effectiveness in performing the work involved.
   2. Little possibility of damaging exposed surfaces.
   3. Consistency of each application.
   4. Uniformity of the resulting overall appearance.
   5. Do not use products or tools that could do the following:
      a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in the Contract.
      b. Leave an unintended residue on surfaces.

2.5 FINISHES, GENERAL

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.

2.6 FERROUS METAL FINISHES

A. Patina Finish: Match existing finish at campanile tower railings in color, texture and patina finish OR as directed by Owner.

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 proved to resist chemical solutions being used unless products being used will not damage adjacent surfaces. Use protective materials that are waterproof and UV resistant. 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 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 HISTORIC DECORATIVE METAL REPAIR, GENERAL

A. Repair Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.
B. Execution of the Work: In repairing historic items, disturb remaining existing work as minimally as possible and as follows:
   1. Stabilize decorative metal to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
   2. Remove deteriorated coatings and corrosion.
   3. Sequence work to minimize time before protective coatings are reapplied.
   4. Repair items where stabilization is insufficient to stop progress of deterioration.
   5. Repair items in place unless otherwise indicated and retain as much original material as possible.
   6. Replace or reproduce historic items where indicated or scheduled.
   7. Make historic treatment of materials reversible whenever possible.
   8. Install temporary protective measures to stabilize decorative metal that is indicated to be repaired later.
C. Mechanical Coating Removal: Use gentlest mechanical methods, such as scraping and wire brushing, that do not abrade metal substrate. Do not use abrasive methods, such as sanding, or power tools except as indicated as part of the historic treatment program and approved by Architect.
D. Repairing Decorative Metal Items: Match existing materials and features, retaining as much original material as possible to complete the repair.
   1. Unless otherwise indicated, repair decorative metals by patching, filling, piecing-in, splicing, or otherwise reinforcing metals with new material matching existing.
   2. Where indicated, repair decorative metal by limited replacement to the extent indicated, matching existing material.
E. Replacing Decorative Metal Components: Where indicated, duplicate and replace items with new metal matching existing metal.
   1. Replace heavily deteriorated or missing parts or features of decorative metal with compatible materials, using surviving prototypes to create patterns or molds for duplicate replacements.
   2. Do not use substitute materials unless otherwise indicated.
   3. Compatible substitute materials may be used.

3.3 PREPARATORY CLEANING

A. Perform preparatory cleaning before performing repair work. Use only those methods indicated for each type of decorative metal and its location.
   1. Brushes: If using wire brushes, use brushes of same base metal composition as metal being treated. Use brushes that are resistant to chemicals 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 spray methods do not damage surfaces.
      a. Equip units with pressure gages.
b. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.

c. For high-pressure water-spray application, use fan-shaped spray that disperses water at an angle of at least 40 degrees.

d. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 degrees F at flow rates indicated.

3. Uniformity: Perform each cleaning method in a manner that results in uniform coverage of all surfaces, including corners, contours, and interstices, and that produces an even effect without streaks or damaging surfaces.

4. Protection: After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

B. Water Cleaning: Clean with hot water applied with medium-pressure spray. Supplement with natural-fiber or plastic bristle brush and abrasive pads. Use small brushes to remove soil and loose paint from joints and crevices. Leave uniform patina intact.

C. Detergent Cleaning:
1. Wet surface with cold or hot water applied with low-pressure spray.
2. Scrub surface with detergent solution and natural-fiber or plastic bristle brush and abrasive pads 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. Leave uniform patina intact.
3. Rinse with cold or hot water applied with low-pressure spray to remove detergent solution and soil.

D. Cleaning by Abrasive Blasting: Clean surfaces to remove dirt and loose paint by dry blasting with specified blasting abrasive at pressure and distance from surface indicated below. Do not rinse ferrous metals with water; wipe with soft brushes and damp cloths to remove residue. Leave uniform patina intact.
1. Pressure and Distance from Surface: Maximum pressure of 100 psi with specified blasting abrasive propelled from a distance of 12 to 18 inches from surface.
2. Pressure and Distance from Surface: As established by mockup.

E. Chemical Rust Removal:
1. Remove loose rust scale with approved, medium abrasives for ferrous metals.
2. Apply rust remover with brushes or as recommended in writing by manufacturer.
3. Allow rust remover to remain on surface for period recommended in writing by manufacturer or as determined by testing. Do not allow extended dwell time.
4. Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended in writing by manufacturer to remove residue.
5. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
6. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

F. Mechanical Rust Removal:
1. Remove rust with approved, medium abrasives for ferrous metals.
2. Wipe off residue with mineral spirits and either steel wool or soft rags.
3. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
4. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

3.4 DISMANTLING, REPAIR, AND INSTALLATION

A. Repair decorative metal in place insofar as practicable, unless otherwise indicated. Where necessary, dismantle components from their substrate and repair and reinstall according to approved historic treatment program.

B. Perform dismantling work as required in Section 02 42 96 "Historic Removal and Dismantling."
C. Installation:
   1. Locate and place decorative metal iron items level and plumb and in alignment with adjacent construction.
      a. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
   2. Use concealed anchorages where possible, unless otherwise indicated.
   3. Form tight joints with exposed connections accurately fitted together.
   4. Install concealed joint fillers, sealants, and flashings, as the Work progresses, to make exterior items weatherproof.
   5. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.
   6. Touch Up: At completion of installation, touch up and restore damaged or defaced finish surfaces and fastener heads.

3.5 PAINTING STEEL UNCOVERED DURING THE WORK

   A. Notify Architect if steel is exposed during metal removal. Where Architect determines that the steel is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
      1. Antirust Coating: Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).
   B. If on inspection and rust removal the thickness of a steel member is found to be reduced from rust by more than 1/16 inch, notify Architect before proceeding.

3.6 FIELD QUALITY CONTROL

   A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
   B. Notify testing agency in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors have had reasonable opportunity to inspect work areas at locations of lift devices or scaffolding.

3.7 HISTORIC DECORATIVE METAL REPAIR SCHEDULE

   A. Treatment of Decorative Railing DMR-1: Wrought-iron railing and gate.
      1. Perform work in the field.
      2. Repairs: Repair railing and replace missing components with hand-worked wrought iron.
      3. Painted Finish: As specified in Section 09 03 91 "Historic Treatment of Plain Painting."

END OF SECTION
SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Miscellaneous steel plate, angles and trim.

B. Products furnished, but not installed, under this Section include the following:
   1. Steel weld plates and angles.

C. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 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.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Paint products.

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. Miscellaneous steel trim including steel angle corner guards steel edgings.

1.4 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."

1.5 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 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   1. Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.
2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3; with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.

2.4 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
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F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 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.

2.7 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim.

2.8 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.9 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.

2.10 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
B. 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. 
   1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 13 "Exterior Painting."

END OF SECTION
SECTION 06 03 12 - HISTORIC WOOD REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment of wood in the form of repairing wood features as follows:
   1. Repairing wood stair treads and riser for restoration of monumental stair.
   2. Replacing deteriorated exterior wood fascia trim at mid-height, low sloping roofs.
   3. Replacing deteriorated exterior wood lookout at mid-height, low sloping roofs.
      Lookout profiles must match existing ogee profile.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 00 31 26 Existing Hazardous Materials Information for Owner-provided
      Hazardous Materials Surveys.
   3. Section 02 42 96 "Historic Removal and Dismantling" for historic removal and
      dismantling work.
   4. Section 09 03 91 "Historic Treatment of Plain Painting."

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review comments from New Mexico Historic Preservation Division that pertain to
      historic wood repair.
   2. Review methods and procedures related to historic wood repair, including, but not
      limited to, the following:
      a. Historic treatment specialist's personnel, equipment, and facilities needed to
         make progress and avoid delays.
      b. Materials, material application, sequencing, tolerances, and required
         clearances.
      c. Fire-protection plan.
      d. Wood historic treatment program.
      e. Coordination with building occupants.

1.3 SEQUENCING AND SCHEDULING

A. Perform historic wood repair in the following sequence, which includes work specified in
   this and other Sections:
   1. Before removing wood components for on-site or off-site repair, tag each
      component with location-identification numbers. Indicate on tags and building plans
      the locations of each component, such as "Baseboard on North Side of Room 101."
   2. Dismantle hardware, if applicable, and tag with location-identification numbers.
   3. In the shop, label each repaired component and whole or partial replacement with
      permanent location-identification number in inconspicuous location and remove
      site-applied tags.
   4. Sort units by condition, separating those that need extensive repair.
   5. Clean surfaces.
   6. General Wood-Repair Sequence:
      a. Remove paint to bare wood.
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95% Construction Documents

b. Repair wood by consolidation, replacement, partial replacement, and patching.
c. Sand, prime, fill, sand again, and prime surfaces again for refinishing.
7. Repair, refinish, and replace hardware if required. Reinstall operating hardware.
8. Reinstall components.
9. Apply finish coats.
10. Install remaining hardware.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings:
   1. Include plans, elevations, and sections showing locations and extent of repair and replacement work, with enlarged details of replacement parts indicating materials, profiles, joinery, reinforcing, method of splicing or attaching wood members to other surfaces, accessory items, and finishes.
   2. Include field-verified dimensions and the following:
      a. Full-size shapes and profiles with complete dimensions for replacement components and their jointing, showing relationship of existing components to new components.
      b. Templates and directions for installing hardware and anchorages.
      c. Identification of each new unit and its corresponding location in the building on annotated plans and elevations.
      d. Provisions for sealant joints and flashing as required for location.

C. Samples for Initial Selection: For each type of exposed wood and finish.
   1. Identify wood species, cut, and other features.
   2. Include Samples of hardware and accessories involving color selection.

D. Samples for Verification: For the following products in manufacturer's standard sizes unless otherwise indicated, finished as required for use in the Work:
   1. Replacement Wood: 12-inch-long, full-size molding sections with applied finish.
      a. Additional Samples of replacement members that show fabrication techniques, materials, and finishes as requested by Architect.
   2. Repaired Wood: Prepare Samples using existing wood removed from site, repaired, and prepared for refinishing.
   3. Refinished Wood: Prepare Samples using existing wood removed from site, repaired, and refinished.
   4. Hardware: Full-size units with each factory-applied or restored finish.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For historic treatment specialist including workers and wood-repair-material manufacturer.
B. Wood Historic Treatment Program: Submit before work begins.
C. Preconstruction Test Reports: For historic wood repair.
1.6 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic wood-repair specialist, experienced in repairing, refinishing, and replacing wood in whole and in part. Experience only in fabricating and installing new woodwork is insufficient experience for wood historic treatment work.

B. Wood-Repair-Material Manufacturer Qualifications: A firm regularly engaged in producing wood consolidant and wood-patching compound that have been used for similar historic wood-treatment applications with successful results, and with factory-authorized service representatives who are available for consultation, Project-site inspection, and on-site assistance.

C. Wood Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site.
1. If materials and methods other than those indicated are proposed for any phase of historic treatment 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.

D. Mockups: Prepare mockups of historic treatment repair processes to demonstrate aesthetic effects and to set quality standards for materials and execution, and for fabrication and installation. Prepare mockups so they are as inconspicuous as practicable.
1. Locate mockups in locations that enable viewing under same conditions as the completed Work.
2. Wood Baseboard Repair: Prepare an approximately 72-inch length of baseboard to serve as mockup to demonstrate samples of each type of wood repair.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified historic treatment specialist to perform preconstruction testing on historic wood materials as follows:
1. Provide test specimens representative of proposed materials and existing construction.
2. Test historic treatment products and methods for effectiveness and compliance with specified requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, broken, or otherwise damaged.

B. Until installed, store products inside a well-ventilated area and protect from weather, moisture, soiling, abrasion, extreme temperatures, and humidity, and where environmental conditions comply with manufacturer's requirements.
1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with historic wood repair only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

PART 2 - PRODUCTS

2.1 HISTORIC WOOD REPAIR, GENERAL

A. Quality Standard: Comply with applicable requirements in Section 12, "Historic Restoration Work," and related requirements in AWI/AWMAC/WI's "Architectural Woodwork Standards" for construction, finishes, grade rules, and other requirements unless otherwise indicated.

2.2 REPLICATED WOOD ITEMS

A. Replicated Wood Insert item: Custom-fabricated replacement wood units and components.
   1. Joint Construction: Joints matching existing joints.
   2. Wood Species: Match species of existing wood.
   4. Wood Member and Trim Profiles: Match profiles and detail of existing.

2.3 WOOD-REPLACEMENT MATERIALS

A. Wood, General: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide.
   1. Species: Match species of each existing type of wood component or assembly unless otherwise indicated.
   B. Monumental stair wood treads; Match existing species.
   C. Exterior Fascia Trim at Mid-Height Roofs: Match existing species.
   D. Exterior Trim at Mid-Height Roofs (Decorative Lookouts): Match existing species.
   E. Interior Trim and Base Boards: Match existing species.

2.4 WOOD-REPAIR MATERIALS

A. Source Limitations: Obtain wood consolidant and wood-patching compound from single source from single manufacturer.

2.5 WOOD FINISHES

A. Unfinished Replacement Units: Provide exposed exterior and interior wood surfaces of replacement units unfinished; smooth, filled, and suitably prepared for on-site priming and finishing.
B. Factory-Finished Units: Latex finish system consisting of primer and two finish coats on exposed exterior wood surfaces.
   1. Finish Coats: Match intermediate coat and topcoat products used for nearby, repaired wood, as specified in Section 09 03 91 "Historic Treatment of Plain Painting."
   2. Color and Gloss: Match existing conditions color and sheen.

PART 3 - EXECUTION

3.1 PREPARATION

   A. Protect adjacent materials from damage by historic wood repair.
   B. Clean wood of 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. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.
   C. Condition replacement wood members and replacement units to prevailing conditions at installation areas before installing.

3.2 HISTORIC WOOD REPAIR, GENERAL

   A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from 5 feet away for interior work and from 20 feet away for exterior work.
   B. General: In treating historic items, disturb them as minimally as possible and as follows:
      1. Stabilize and repair wood to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
      2. Remove coatings and apply borate preservative treatment before repair. Remove coatings according to Section 09 03 91 "Historic Treatment of Plain Painting" unless otherwise indicated.
      3. Repair items in place where possible.
      4. Install temporary protective measures to protect wood-treatment work that is indicated to be completed later.
      5. Refinish historic wood according to Section 09 03 91 "Historic Treatment of Plain Painting" unless otherwise indicated.
   C. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade wood substrate, reducing clarity of detail. Do not use abrasive methods, such as sanding, wire brushing, or power tools, except as indicated as part of the historic treatment program and as approved by Architect.
   D. Repair and Refinish Existing Hardware: Dismantle hardware; strip paint, repair, and refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.
   E. Repair Wood: Match existing materials and features, retaining as much original material as possible to perform repairs.
      1. Unless otherwise indicated, repair wood by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.
      2. Where indicated, repair wood by limited replacement matching existing material.
F. Replace Wood: Where indicated, duplicate and replace units with units made from salvaged, sound, original wood or with new wood matching existing wood. Use surviving prototypes to create patterns for duplicate replacements.
   1. Do not use substitute materials unless otherwise indicated.
   2. Compatible substitute materials may be used.

G. Identify removed items with numbering system corresponding to item locations, to ensure reinstallation in same location. Key items to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.3 WOOD PATCH-TYPE REPAIR
A. General: Patch wood that exhibits depressions, holes, or similar voids, and that has limited amounts of rotted or decayed wood.
   1. Verify that surfaces are sufficiently clean and free of paint residue prior to patching.
   2. Remove rotted or decayed wood down to sound wood.

3.4 WOOD-REPLACEMENT REPAIR
A. General: Replace parts of or entire wood items at locations indicated on Drawings and where damage is too extensive to patch.
   1. Remove surface-attached items from wood surface before performing wood-replacement repairs unless otherwise indicated.
   2. Verify that surfaces are sufficiently clean and free of paint residue prior to repair.
   3. Remove broken, rotted, and decayed wood down to sound wood.
   4. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member.
   5. Secure new wood using finger joints, multiple dowels, or splines with adhesive and nailing to ensure maximum structural integrity at each splice. Use only concealed fasteners. Fill nail holes and patch surface to match surrounding sound wood.

B. Repair remaining depressions, holes, or similar voids with patch-type repairs.
C. Clean spilled materials from adjacent surfaces immediately.
D. Reinstall items removed for repair into original locations.

3.5 FIELD QUALITY CONTROL
A. Manufacturers Field Service: Engage wood-repair-material manufacturers' factory-authorized service representatives for consultation and Project-site inspection, and provide on-site assistance when requested by Architect.

3.6 ADJUSTMENT
A. Adjust existing and replacement operating items, hardware, and accessories for a tight fit at contact points and for smooth operation and tight closure. Lubricate hardware and moving parts.

3.7 CLEANING AND PROTECTION
A. Protect wood surfaces from contact with contaminating substances resulting from construction operations. Monitor wood surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact wood surfaces, remove contaminants immediately.
B. Clean exposed surfaces immediately after historic wood repair. Avoid damage to coatings and finishes. Remove excess sealants, patching materials, dirt, and other substances.

END OF SECTION
SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Framing with engineered wood products.
   2. Wood Blocking and Nailers
   3. Structural Plywood Roof Decking at Clay Roof Tiles and in intermediate roof attic areas.
   4. Structural 1x lumber used at Clay Roof Tiles historically matching existing roof decking wood species.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than two inches nominal size in least dimension.
B. Exposed Framing: Framing not concealed by other construction.
C. Plywood Roof Decking: Concealed, exterior grade structural pressure-treated plywood roof decking performing as a structural deck substrate under specified roofing systems.
D. Hardwood Lumber Roof Decking: Concealed, exterior grade pressure-treated plywood roof decking matching existing roof decking wood species. **Use this roof decking where existing roof decking is similar.**

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
   3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
   4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: 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.
1.5 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: 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: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness unless otherwise indicated.
C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
   1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. 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.

2.2 ENGINEERED WOOD PRODUCTS

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Georgia-Pacific Building Products.
      b. Louisiana-Pacific Corporation.
      c. Pacific Woodtech Corporation.
      d. Weyerhaeuser Company.
   2. Extreme Fiber Stress in Bending, Edgewise: 2600 psi for 12-inch nominal-depth members.
   3. Modulus of Elasticity, Edgewise: 1,500,000 psi.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
B. Concealed Boards: 15 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); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

C. 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.

D. 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.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

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 rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

D. Do not splice structural members between supports unless otherwise indicated.

E. 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 o.c.

F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

   1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

   2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 square feet and to solidly fill space below partitions.

4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

G. 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.

H. 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.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   2. ICC-ES evaluation report for fastener.

J. 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 finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
   3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or 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.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

END OF SECTION
SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior stairs and railings.

B. Related Requirements:
   1. Section 06 10 00 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
   2. Section 09 91 23 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.2 DEFINITIONS

A. MDF: Medium-density fiberboard.
B. MDO: Plywood with a medium-density overlay on the face.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
   1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
   2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
   3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

B. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

C. Samples for Verification:
   1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished, 50 square inches for lumber and 8 by 10 inches for panels.
   2. For each finish system and color of lumber and panel products with factory-applied finish, 50 square inches for lumber and 8 by 10 inches for panels.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For fire-retardant-treated wood, from ICC-ES.
B. Sample Warranty: For manufacturer's warranty.
1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
   1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Softwood Plywood: DOC PS 1.
B. Hardboard: ANSI A135.4.
C. MDF: ANSI A208.2, Grade 130.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process; AWPA U1; Use Category.
   1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.
   2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
   4. Do not use material that is warped or does not comply with requirements for untreated material.
   5. Mark lumber with treatment-quality mark of an inspection agency approved by the American Lumber Standard Committee’s Board of Review.
      a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
   6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
      a. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.
7. Application: All interior lumber and plywood.

2.3 STAIRS AND RAILINGS

A. Treads: clear, kiln-dried, matching existing dimensions, nosing profile and wood species. Replace existing treads only as required for wood treads unsalvagable for reuse.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish matching existing and only as required for application indicated to provide secure attachment, concealed where possible.
B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

2.5 FABRICATION

A. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius. Match existing edge treatment conditions at existing historical staircases.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.
B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
   1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
   2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
   3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
4. Install stairs with no more than 3/16-inch variation between adjacent treads and risers and with no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

### 3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
2. Install trim after gypsum-board joint finishing operations are completed.
3. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

### 3.5 STAIR AND RAILING INSTALLATION

A. Treads and Risers at Interior Stairs: Secure treads and risers by gluing and nailing to rough carriages. Match fastening techniques with existing stair construction.

### 3.6 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

### 3.7 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes if any.

### 3.8 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.
B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
SECTION 07 01 50.19 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Partial tear-off of entire roof areas for phasing purposes.
   2. Re-cover preparation.
   4. Temporary roofing.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 10 00 "Summary" for use of premises and for phasing requirements.

1.2 DEFINITIONS

A. XPS: Molded (extruded) polystyrene.
B. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck.
C. OSB: Oriented strand board.
D. Partial Roof Tear-off: Removal of selected components and accessories from existing roof system.
F. Roof Re-Cover Preparation: Existing roofing system is to remain and be prepared for new roof installed over it.

1.3 PREINSTALLATION MEETINGS

   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.

o. Removal from roof and cleaning of existing aggregate ballast prior to re-installation and distribution on new roofing membrane. Roof ballast will not be permitted to be cleaned on the roof deck.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Temporary Roofing Submittal: Product data and description of temporary roofing system.

   1. If temporary roof remains in place, include surface preparation requirements needed to receive permanent roof, and submit a letter from roofing manufacturer stating acceptance of the temporary roof and that its inclusion does not adversely affect the new roofing system's resistance to fire and wind.

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. Field Test Reports:

   1. Fastener pull-out test report.

C. Photographs or Videotape: 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.

D. Landfill Records: Indicate receipt and acceptance of demolished roofing materials and hazardous wastes, such as asbestos-containing materials, by a landfill facility licensed to accept them.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:

   1. Comply with governing EPA notification regulations before beginning roofing removal.

   2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 FIELD CONDITIONS

A. Existing Roofing System: EPDM 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.
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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.

4. Work must be performed during hours designated by Owner so as not to disrupt student activities.

5. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.
   a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck 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.
   1. The results of an analysis of test cores from existing roofing system are available for Contractor's reference.
   2. Construction Drawings and Project Manual for existing roofing system are provided for Contractor's convenience and information, but they are not a warranty of existing conditions. They are intended to supplement rather than serve in lieu of Contractor's own investigations. Contractor is responsible for conclusions derived from existing documents.

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: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. Existing roof will be left no less watertight than before removal.
   3. 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.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS
   A. EPS Insulation: ASTM C 578.
   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.
   B. Sheathing Paper: Red-rosin type, minimum 3 pounds per 100 square feet.
   E. Asphalt Primer: ASTM D 41/D 41M.
F. Roofing Asphalt: ASTM D 312/D 312M, Type III or IV.
G. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Approvals' RoofNav.

2.3 INFILL AND REPLACEMENT MATERIALS

A. Use infill materials matching existing roofing system materials unless otherwise indicated.
   1. Infill materials are specified in Section 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" or Section 07 54 16 "Ethylene Interpolymer (KEE) Roofing" unless otherwise indicated.

B. Wood blocking, curbs, and nailers are specified in Section 06 10 00 "Rough Carpentry."

C. Fasteners: Factory-coated steel fasteners with metal or plastic plates listed in FM Approvals' RoofNav, and acceptable to new roofing system manufacturer.

2.4 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. Loosely lay 1-inch- minimum thick, EPS insulation over existing roofing in areas not to be reroofed.
      a. Loosely lay 15/32-inch plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch.
   3. Limit traffic and material storage to areas of existing roofing that have been protected.
   4. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.
   5. 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. Test existing roof drains to verify that they are not blocked or restricted.
   1. Immediately notify Architect of any blockages or restrictions.

D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work, if required.
   1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

E. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

F. 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. Remove aggregate ballast from roofing. Store aggregate ballast on ground for reuse in manner not to exceed structural loading limitations of roof deck.
D. Remove loose aggregate from aggregate-surfaced, built-up bituminous roofing using a power broom.
E. Partial Roof Tear-off: Remove existing roofing down to existing lightweight concrete deck and immediately check for presence of moisture.
   1. Survey exposed substrate that is to remain using infrared color thermography according to ASTM C 1153.
      a. Prepare survey report of initial scan indicating locations of entrapped moisture, if any, and area calculations of locations of entrapped moisture.
   2. Inspect wood blocking, curbs, and nailers for deterioration and damage.
      a. If wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
   3. 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.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of roofing system.
B. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect.
   1. Do not proceed with installation until directed by Architect.

3.4 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 07 53 23 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" or Section 07 54 16 "Ethylene Interpolymer (KEE) Roofing."
   2. Installation of wood blocking, curbs, and nailers is specified in Section 06 10 00 "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.
3.5 TEMPORARY ROOFING

A. Install approved temporary roofing over area to be reroofed.
B. Remove temporary roofing before installing new roofing.

3.6 ROOF RE-COVER PREPARATION

A. Remove blisters, ridges, buckles, mechanically attached roofing fastener buttons projecting above roofing, and other substrate irregularities from existing roofing that inhibit new recover boards from conforming to substrate.
1. Remove loose aggregate from aggregate-surfaced, existing EPDM roofing with a power broom.
2. Broom clean existing lightweight concrete deck substrate.
3. Coordinate with Owner's inspector to schedule times for tests and inspections.
4. Verify that existing substrate is dry.
   a. Spot check substrates with an electrical capacitance moisture-detection meter.
5. Remove materials that are wet or damp.
   a. Removal will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.
B. Remove blisters and areas of roofing not fully adhered.
C. Remove mechanically attached roofing fastener buttons projecting above roofing and other substrate irregularities that inhibit new recover boards from conforming to substrate.
1. Remove loose aggregate from aggregate-surfaced, built-up bituminous roofing with a power broom.
2. Power vacuum the existing roof surface.

3.7 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 specified in Section 07 62 00 "Sheet Metal Flashing and Trim."
C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage.
   1. If parapet wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
D. Remove existing parapet sheathing and replace with new parapet sheathing to comply with Section 06 16 00 "Sheathing."
   1. If parapet framing, wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
E. When directed by Architect, replace parapet framing, wood blocking, curbs, and nailers to comply with Section 06 10 00 "Rough Carpentry."
3.8 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
SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Mineral-wool board at exposed concrete roof deck areas inside intermediate roof attic areas.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 06 10 00 "Rough Carpentry" for plywood roof decking as a protection cover board.

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.

PART 2 - PRODUCTS

2.1 MINERAL-WOOL BOARD

A. Mineral-Wool Board, Types IA and IB, Unfaced for installation at concrete roof deck areas inside intermediate roof attic areas: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb./cu. ft..

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Industrial Insulation Group, LLC.
   b. Roxul Inc.
   c. Thermafiber, Inc.; an Owens Corning company.

2.2 ACCESSORIES

A. Adhesive for Bonding Insulation: Product compatible with insulation, 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 SLAB INSULATION

A. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units. Install in thickness to achieve R25 thermal value inclusive of 3/4" plywood decking, but not less than 6 inches total thickness. Use board widths that accommodate installation between existing wood truss structural framing. Verify field conditions prior to ordering.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION
SECTION 07 32 13 - CLAY ROOF TILES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   2. Underlayment.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079, glossaries in TRI/WSRCA’s "Concrete and Clay Roof Tile Design Criteria Installation Manual for Moderate Climate Regions,” and NRCA’s "NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.
   1. Clay Roof Tiles: Full size, showing full range of values and blends.
   2. Accessory Tiles: Full size.

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each type of clay roof tile, based on evaluation of comprehensive tests performed by a qualified testing agency.

B. Evaluation Reports: From ICC-ES or other testing and inspecting agency acceptable to authorities having jurisdiction, indicating that product is suitable for intended use under applicable building codes for the following:
   1. Clay roof tiles, fasteners, and attachment systems.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockups for clay roof tiles including related roofing materials.
      a. Size: 60 inches long by 72 inches wide.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store underlayment rolls in a dry, well-ventilated location protected from weather, sunlight, and moisture according to manufacturer's written instructions.
   1. Store on end, on pallets or other raised surfaces. Do not double stack rolls.
B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.
C. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.
   1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.10 WARRANTY

A. Materials Warranty: Manufacturer agrees to repair or replace clay roof tiles that fail in materials within specified warranty period.
   1. Warranty Period: 50 years from date of Substantial Completion.
B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of clay-tile roofing that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Exterior Fire-Test Exposure: Provide clay roof tiles and related roofing materials identical to those of assemblies tested for Class A fire resistance according to ASTM E 108 or UL 790 by Underwriters Laboratories, Inc. or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

2.2 CLAY ROOF TILES

A. Clay Roof Tiles: ASTM C 1167, molded- or extruded-clay roof tile units of shape and configuration indicated, kiln fired, and free of surface imperfections. Provide with fastening holes prepunched at factory before firing.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
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b. Gladding, McBean; a division of Pacific Coast Building Products, Inc.
c. Ludowici Roof Tile.
d. M.C.A. (Maruhachi Ceramics of America, Inc.).

2. Durability: Grade 1.
3. High-Profile Shape: Type I, straight barrel mission.
   a. Accessory Tiles: Ridge starter eave closure top fixture units.
4. Size: New tile must dimensionally match existing clay roof tiles at campanile and lower projected roof areas.
5. Finish and Texture: Matte, smooth.
6. Color: Terra cotta

2.3 UNDERLAYER MATERIALS

A. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 75-mil- thick; with slip-resisting, polymer-film-reinforced or glass-reinforced top surface laminated to layer of butyl or SBS-modified-asphalt adhesive; with release backing; cold applied; and evaluated and documented to be suitable for use for intended purpose under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.
1. Manufacturers: Subject to compliance with requirements:
2. Basis-of-Design Product: Subject to compliance with requirements, provide TAMKO TW Metal and Tile Underlayment (minimum 75 mil thickness) or comparable product by one of the following:
   b. GAF Materials Corporation.
   d. Henry Company.
   e. TAMKO Building Products, Inc.
4. Low-Temperature Flexibility: Passes after testing at minus 20 degrees F according to ASTM D 1970/D 1970M.

2.4 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D 4586/D 4586M, Type II, asbestos free.
B. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.
C. Elastomeric Sealant: ASTM C 920, elastomeric silicone-based joint sealant of type, grade, class, and use classifications required to seal joints in clay-tile roofing and remain watertight.
D. Roofing Asphalt: ASTM D 312, Type IV.
E. Flexible Roof Mortar: pigmented flexible mortar matching the color of clay roof tiles for exposed-to-view mortar, and natural color for concealed-from-view mortar. Provide FLEXIM flexible roof mortar manufactured by Roofing Technology Systems, or equal.
F. Wood Nailers: Comply with requirements for pressure-preservative-treated wood in Section 06 10 00 "Rough Carpentry."
2.5 FASTENERS

A. Roofing Nails: ASTM F 1667, copper, 0.135-inch- diameter shank, sharp-pointed, conventional roofing nails with barbed shanks; minimum 3/8-inch- diameter head; of sufficient length to penetrate 3/4 inch into substrate or through thickness of the sheathing, whichever is less. Stainless steel screws can be substituted for roof nails holding tile to pressure treated nailers.
   1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

B. Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile metal or plastic caps, 1-inch minimum diameter.
   1. Provide cap nails complying with written instructions of synthetic-underlayment manufacturer.
   2. Provide with minimum 0.0134-inch- thick cap, and with minimum 0.105-inch- thick shank of length to penetrate at least 3/4 inch into roof sheathing.

C. Wood Batten Nails: ASTM F 1667; common or box, steel wire, flat head, and smooth shank.

D. Wire Ties: Stainless steel, 0.083-inch minimum diameter.

E. Hook Nails: One-piece wind lock and clay roof tile fastener system, minimum 0.120-inch- diameter stainless-steel wire, for direct deck nailing.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
      b. Wire Works, Inc.

F. Tile Locks: Stainless-steel, 0.1-inch- diameter wire device designed to secure butt edges of overlaid clay roof tiles.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide products by one of the following:
      b. Wire Works, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provision has been made for flashings and penetrations through roofing.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 UNDERLAYMENT INSTALLATION

A. General: Comply with clay roof tile manufacturer's written instructions and with recommendations in NRCA's "NRCA Roofing Manual: Steep-Slope Roof Systems" unless more stringent requirements are indicated.
   1. Cover ridge wood nailers with underlayment strips.

B. Self-Adhering Sheet Underlayment: Install wrinkle free; comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches, staggered 24 inches between succeeding courses. Roll laps with roller. Cover underlayment within seven days.
   1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.
   2. Extend self-adhering sheet underlayment over entire roof deck.
   3. Hips: Extend 18 inches on each side.
   4. Ridges: Extend 36 inches on each side.
   5. Roof-Slope Transitions: Extend 18 inches on each roof slope.

3.3 WOOD NAILERS

A. Install wood nailers securely fastened to roof deck at the following locations:
   1. Hips.
   2. Ridges.

B. Install beveled wood cant at eaves and securely fasten to roof deck.

3.4 CLAY ROOF TILE INSTALLATION

A. General: Install clay roof tiles according to manufacturer's written instructions and recommendations in TRI/WSRCA's "Concrete and Clay Roof Tile Design Criteria Installation Manual for Moderate Climate Regions" and NRCA's "NRCA Roofing Manual: Steep-Slope Roof Systems" unless more stringent requirements are indicated.
   1. Maintain uniform exposure and coursing of clay roof tiles throughout roof.
   2. Extend tiles 2 inches over eave fasciae.
   3. Nail or Screw Fastening: Drive nails or screws to clear the clay roof tile so the tile hangs from the nail and is not drawn up.
      a. Install wire through nail holes of cut tiles that cannot be nailed directly to roof deck and fasten to nails driven into deck.
   4. Tile Locks: Install to support and lock overlying tile butts to underlying tiles.
   5. Cut and fit clay roof tiles neatly around roof vents, pipes, ventilators, and other projections through roof. Fill voids with mortar.
   6. Install clay roof tiles with color blend approved by Architect.

B. High-Profile Clay Roof Tile Installation:
   1. Install tile eave closure.
   2. Provide minimum 3-inch lap between succeeding courses of clay roof tiles.
   3. Install rake tiles indicated.
   4. Install ridge tiles with laps facing away from prevailing wind. Seal laps with butyl sealant.

3.5 ADJUSTING AND CLEANING

A. Remove and replace damaged or broken clay roof tiles.

B. Remove excess clay roof tiles and debris from Project site.
3.6 ROOFING INSTALLER’S WARRANTY

A. WHEREAS >Insert name< of >Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:
   1. Owner: <Insert name of Owner>.
   2. Address: <Insert address>.
   3. Building Name/Type: <Insert information>.
   4. Address: <Insert address>.
   5. Area of the Work: <Insert information>.
   6. Acceptance Date: <Insert date>.
   7. Warranty Period: <Insert time>.
   8. Expiration Date: <Insert date>.

AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the 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 he will, at his own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the 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 the work and other parts of the building, and to building contents, caused by:
      a. Lightning;
      b. Peak gust wind speed exceeding 72 mph;
      c. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
      d. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
      e. Vapor condensation on bottom of roofing; and
      f. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
   2. When the 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 the 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 the work.
   4. During Warranty Period, if Owner allows alteration of the 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 the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty shall not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the 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 use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the 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 the 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 the 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 the 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 >Insert day< day of >Insert month<, <Insert year>.

1. Authorized Signature: <Insert signature>.
2. Name: <Insert name>.
3. Title: <Insert title>.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane roofing.
   2. Installation of sound-absorbing insulation strips in ribs of roof deck. Sound-absorbing insulation strips are furnished under Section 05 31 00 "Steel Decking."

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking, and for wood-based, structural-use roof deck panels.
   3. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
   4. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS


1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
   1. Meet with Owner, Construction Manager, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   5. Review structural loading limitations of roof deck during and after roofing.
   6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
   7. Review governing regulations and requirements for insurance and certificates if applicable.
   8. Review temporary protection requirements for roofing system during and after installation.
   9. Review roof observation and repair procedures after roofing installation.
1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. 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. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
   5. Crickets, saddles, and tapered edge strips, including slopes.
   6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
   7. Tie-in with adjoining air barrier.

C. Samples for Verification: For the following products:
   1. Retain one or more subparagraphs below.
   2. Cap Sheet: Samples of manufacturer's standard colors for selection by Architect.
   3. Flashing Sheet: Samples of manufacturer's standard colors for selection by Architect.
   4. Aggregate surfacing material in gradation and color required.

D. Wind Uplift Resistance Submittal: For roofing system indicating compliance with wind uplift performance requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates:
      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 roof membrane and insulation, tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Field Test Reports:
   1. Concrete internal relative humidity test reports.
   2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Sample Warranties: For manufacturer's special warranties.

1.6 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.
1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed 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.

1.8 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.

1.9 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.

1.10 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, and other components of roofing system.
   2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, for the following warranty period:
   1. Warranty Period: Two years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746/D 3746M, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): <Insert lbf/sq. ft.>.
2. Zone 2 (Roof Area Perimeter): <Insert lbf/sq. ft.>.
   a. Location: From roof edge to <Insert dimension> inside roof edge.
3. Zone 3 (Roof Area Corners): <Insert lbf/sq. ft.>.
   a. Location: <Insert dimension> in each direction from each building corner.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class I or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail-Resistance Rating: SH.

E. ENERGY STAR Listing: Roofing system shall be listed on the DOE’s ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

F. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

G. Exterior Fire-Test Exposure: ASTM E 108 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.

H. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated.

1. Identify products with appropriate markings of applicable testing agency.

2.2 MANUFACTURERS

A. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.
2.3 **BASE SHEET MATERIALS**

A. **SBS-Modified Bitumen Polyester Mat Base Sheet**: ASTM D 6164/D 6164M, Type I, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric, smooth surfaced, suitable for cold adhesive or hot asphalt application method.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Firestone Building Products.
      b. GAF.
      c. Johns Manville; a Berkshire Hathaway company.
      d. Tremco Incorporated.
      e. Siplast.

B. **Asphalt-Coated Fiberglass Mat Base Sheet**: ASTM D 4601/D 4601M, Type II, nonperforated, asphalt-impregnated and -coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.

2.4 **INTERPLY SHEETS**

A. **Glass-Fiber Interply Sheet**: ASTM D 2178/D 2178M, Type IV, asphalt-impregnated, glass-fiber felt.

2.5 **STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS CAP SHEET**

A. **Granule-Surfaced Roofing Cap Sheet**: ASTM D 6164/D 6164M, Type I, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric, suitable for cold adhesive or hot asphalt application method.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Firestone Building Products.
      b. GAF.
      c. Johns Manville; a Berkshire Hathaway company.
      d. Tremco Incorporated.
      e. Siplast.
   2. Granule Color: Match existing granulated sheet.

2.6 **BASE FLASHING SHEET MATERIALS**

A. **Backer Sheet**: ASTM D 2626/D 2626M, asphalt-saturated and -coated organic felt, dusted with fine mineral surfacing on both sides.

B. **Granule-Surfaced Flashing Sheet**: ASTM D 6164/D 6164M, Type I or II, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric, granule surfaced, suitable for application method specified, and as follows:

2.7 **AUXILIARY ROOFING MATERIALS**

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
   1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. **Roof Vents**: As recommended by roof membrane manufacturer.
   1. Size: Not less than 4-inch diameter.
C. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft.
D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
E. Asphalt Roofing Cement: ASTM D 4586/D 4586M, asbestos free, of consistency required by roofing system manufacturer for application.
F. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.
G. 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.
H. Roofing Granules: Ceramic-coated or Slate roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve; color to match roof membrane.
I. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.8 ASPHALT MATERIALS

A. Asphalt Primer: ASTM D 41/D 41M.
B. Roofing Asphalt: ASTM D 312/D 312M, Type III or IV as recommended by roofing system manufacturer for application.

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 deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
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 according to 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. Prime surface of deck with asphalt primer at a rate of 3/4 gal./100 sq. ft., and allow primer to dry.
3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system at 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.

D. Asphalt Heating:
1. Heat asphalt to its equiviscous temperature, measured at the mop cart or mechanical spreader immediately before application.
   a. For cap sheets, heat asphalt according to cap sheet manufacturer's recommendations.

2. Circulate asphalt during heating.

3. Do not raise asphalt temperature above equiviscous temperature range more than one hour before time of application.
   a. For cap sheets, comply with cap sheet manufacturer's recommendations.

4. Do not exceed asphalt manufacturer's recommended temperature limits during asphalt heating.

5. Do not heat asphalt within 25 deg F of flash point.

6. Discard asphalt maintained at a temperature exceeding finished blowing temperature for more than four hours.

7. Apply hot roofing asphalt within plus or minus 25 deg F of equiviscous temperature.
   a. For cap sheets, comply with cap sheet manufacturer's recommendations.

E. Asphalt Heating: Heat and apply SEBS-modified roofing asphalt according to roofing system manufacturer's written instructions.

F. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing system according to 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. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

C. Where roof slope exceeds 1/2 inch per 12 inches, install roofing membrane sheets parallel with slope.
1. Backnail roofing sheets to substrate according to roofing system manufacturer's written instructions.

D. 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.

3.5 BASE SHEET INSTALLATION

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. Loosely lay one course of sheathing paper, lapping edges and ends a minimum of 2 inches and 6 inches, respectively.
C. Installation of SBS-Modified Bitumen Polyester-Mat Base Sheet:
   1. Install base sheet according to 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. Mechanically attach base sheet to roof deck using mechanical fasteners specifically designed and sized for fastening base sheet to wood decks.
      a. Fasten base sheet to resist specified uplift pressure at corners, perimeter, and field of roof.
   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.
      b. Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches.
      c. Stagger end laps not less than 18 inches.
      d. Completely bond and seal laps, leaving no voids.
      e. Roll laps with a 20-pound roller.
   7. Repair tears and voids in laps and lapped seams not completely sealed.
   8. Apply pressure to the body of the base sheet according to manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

3.6 INSTALLATION OF INTERPLY SHEETS

A. Install three ply sheets, starting at low point of roofing.
   1. Align ply sheets without stretching.
   2. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane.
      a. Shingle in direction to shed water.
   3. Extend ply sheets over and terminate above cants.

3.7 SBS-MODIFIED BITUMINOUS CAP SHEET INSTALLATION

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 according to roofing manufacturer's written instructions, starting at low point of roofing system.
   1. Install cap sheet as follows:
      a. Adhere to substrate in a solid mopping of hot roofing asphalt applied at asphalt temperature recommended by cap sheet manufacturer.
   2. Install cap sheet without wrinkles or tears, and free from air pockets.
   3. 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.
   2. Completely bond and seal laps, leaving no voids.
   3. Roll laps with a 20-pound roller.
   4. Repair tears and voids in laps and lapped seams not completely sealed.

D. Apply pressure to the body of the cap sheet according to manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

E. Apply roofing granules of same color as roof membrane to cover exuded bead at laps while bead is hot, to provide a continuous color appearance.

3.8 FLASHING AND STRIPPING INSTALLATION

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 according to roofing system manufacturer's written instructions and as follows:
   1. Prime substrates with asphalt primer if required by roofing system manufacturer.
   2. Backer Sheet Application:
      a. Mechanically fasten backer sheet to walls or parapets.
      b. Adhere backer sheet over roofing membrane at cants in a solid mopping of hot roofing asphalt.
      c. Seal all laps.
   3. Backer Sheet Application:
      a. Adhere backer sheet to substrate in a solid mopping of hot roofing asphalt.
      b. Seal all laps.
   4. Flashing Sheet Application: Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt applied at asphalt temperature recommended by flashing sheet manufacturer. Apply hot roofing asphalt to back of flashing sheet if recommended by roofing system manufacturer.

B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

D. Install liquid flashing system according to manufacturer's recommendations.
   1. Extend liquid flashing not less than 3 inches 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 according to roofing system manufacturer's written instructions.
3.9 FIELD QUALITY CONTROL

A. Perform the following tests:
   1. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
      a. Perform tests before overlying construction is placed.
      b. Flood each area for 124 hour.
      c. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.

B. 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.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. 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.

3.10 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 according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _______________________________ of ___________________________, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
   1. Owner: <Insert name of Owner>.
   2. Address: <Insert address>.
   3. Building Name/Type: <Insert information>.
   4. 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 72 mph;
   c. fire;
   d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. vapor condensation on bottom of roofing; and
   g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

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
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system.
   2. Loosely laid and ballasted, ethylene-propylene-diene-terpolymer (EPDM) roofing system.
   3. Roof insulation.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking and for wood-based, structural-use roof deck panels.
   3. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Examine deck substrate conditions and finishes, including flatness and fastening.
   5. Review structural loading limitations of roof deck during and after roofing.
   6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
   7. Review governing regulations and requirements for insurance and certificates if applicable.
   8. Review temporary protection requirements for roofing system during and after installation.
   9. Review roof observation and repair procedures after roofing installation.
1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
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 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.
C. Samples for Verification: For the following products:
   1. Roof membrane and flashings of color required.
   2. Aggregate surfacing material in gradation and color required.
D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.
B. Manufacturer Certificates:
      a. Submit evidence of complying with performance requirements.
   2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
C. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.
D. Evaluation Reports: For components of roofing system, from ICC-ES.
   1. Field Test Reports:
   2. Concrete internal relative humidity test reports.
   3. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.
E. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed 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.
1.8 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.

1.9 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.

1.10 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, cover boards, and other components of roofing system.
   2. Warranty Period: 20 years from Date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, cover boards, and, for the following warranty period:
   1. Warranty Period: Two years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings shall remain watertight.
   1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
   2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.
B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): \(<\text{Insert lbf/sq. ft.}>\).
2. Zone 2 (Roof Area Perimeter): \(<\text{Insert lbf/sq. ft.}>\).
   a. Location: From roof edge to \(<\text{Insert dimension}>\) inside roof edge.
3. Zone 3 (Roof Area Corners): \(<\text{Insert lbf/sq. ft.}>\).
   a. Location: \(<\text{Insert dimension}>\) in each direction from building corner.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class I or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail-Resistance Rating: SH.

E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

F. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

G. Exterior Fire-Test Exposure: ASTM E 108 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.

H. 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 D 4637/D 4637M, Type I, nonreinforced, EPDM sheet with factory-applied seam tape.

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

2. Basis-of-Design Product: Subject to compliance with requirements, provide Carlisle Sure-Seal 60-mil non-reinforced EPDM or comparable product by one of the following:
   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products.
   c. Johns Manville; a Berkshire Hathaway company.
   d. Versico Incorporated.

3. Thickness: 60 mils, nominal. Owner may elect to reduce to 45 mils.
4. Exposed Face Color: White on black.
5. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55 to 60 mils thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

Slip Sheet: Manufacturer's standard, of thickness required for application.

Vented Base Sheet: ASTM D 4897/D 4897M, Type II; nonperforated, asphalt-impregnated fiberglass reinforced, with mineral granular patterned surfacing on bottom surface.

Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

Roof Vents: As recommended by roof membrane manufacturer.

1. Size: Not less than 4-inch diameter.

Bonding Adhesive: Manufacturer's standard.

Seaming Material: Single-component, butyl splicing adhesive and splice cleaner Manufacturer's standard, synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film Factory-applied seam tape, width as recommended by manufacturer.

Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

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 stainless steel fasteners with neoprene washers.

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.

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.

Provide white flashing accessories for white EPDM membrane roofing.

2.4 SUBSTRATE BOARDS

A. Refer to "06 61 00 Rough Carpentry."

2.5 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by EPDM roof membrane manufacturer.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Carlisle Insulbase Polyisocynurate or comparable product by one of the following:
   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products.
   c. GAF Materials Corporation.
   d. Johns Manville; a Berkshire Hathaway company.
   e. Rmax, Inc.

2. Compressive Strength: 20 psi.

3. Size: 48 by 48, 48 by 96 inches or combinations thereof.
4. Thickness:
   b. Upper Layer: Provide in thickness required to achieve minimum R25 with continuous insulation but no less than 3 inches.

2.6 INSULATION ACCESSORIES

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. Modified asphaltic, asbestos-free, cold-applied adhesive.

   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. CertainTeed Corporation; GlasRoc Roof Board.
      b. Georgia-Pacific Building Products; Dens Deck.
      c. National Gypsum Company; DEXcell FA Glass Mat Roof Board.
      d. United States Gypsum Company; Securock Glass Mat Roof Board.
   2. Thickness: 1/2 inch.

2.7 ASPHALT MATERIALS

A. Roofing Asphalt: ASTM D 312/D 312M, Type III or Type IV ASTM D 6152/D 6152M, SEBS modified.

2.8 BALLAST

A. Aggregate Ballast: Smooth, washed, riverbed gravel or other acceptable smooth-faced stone that withstands weather exposure without significant deterioration and does not contribute to membrane degradation, of the following size:
   2. Size: ASTM D 448, Size 2, ranging in size from 1-1/2 to 2-1/2 inches.
   3. Existing roof aggregate ballast may be reclaimed for reuse after it has been thoroughly washed. Existing aggregate ballast must be supplemented with new to meet field, perimeter and corner required uplift resistance as calculated per SPRI RP-4.

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. Assess and verify existing wood deck is adequate to receive new roofing system. Replace damaged or deteriorated wood deck components with materials dimensionally matching (thickness and size) existing conditions. Refer to "06 10 00 Rough Carpentry" for material requirements.
4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
5. Verify existing concrete substrates, if present and visible, are 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 F 2170.
   a. Test Frequency: One test probe per each 1000 square feet, or portion thereof, of roof deck, with not less than three test probes.
   b. Submit test reports within 24 hours of performing tests.
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.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.
B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install replacement substrate boards with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows. Isolated substrate replacements must fit appropriately to completely fill damaged or deteriorated areas.
   1. Tightly butt substrate boards together.
   2. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
      a. Attach replacement substrate boards over existing concrete roof deck matching existing wood decking substrate board conditions, (mopped in place, adhered or mechanically attached).

3.5 INSULATION INSTALLATION

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 Wood Decking:
   1. Mechanically fasten Type II base sheet to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to wood decks.
      a. Fasten base sheet to resist specified uplift pressure at corners, perimeter, and field of roof.
   2. Install (Hot Mop) base layer of insulation with joints staggered not less than 24 inches in adjacent rows to base sheet.
      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 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.
         1) Trim insulation so that water flow is unrestricted.
      e. Fill gaps exceeding 1/4 inch with insulation.
      f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
      g. Hot mop base layer insulation units to base sheet mechanically fastened to wood deck substrate.
   3. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
      a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
      b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
      c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
      d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
      e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
         1) Trim insulation so that water flow is unrestricted.
      f. Fill gaps exceeding 1/4 inch with insulation.
      g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
      h. Adhere each layer of insulation to substrate using adhesive according to FM Approvals’ RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
         1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 degrees F of equiviscous temperature.
         2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
3.6 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
   1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   2. At internal roof drains, conform to slope of drain sump.
      a. Trim cover board so that water flow is unrestricted.
   3. Cut and fit cover board tight to nailers, projections, and penetrations.
   4. Loosely lay cover board over substrate.
   5. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
      a. Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 degrees F of equiviscous temperature.

B. Install slip sheet over cover board and immediately beneath roofing.

3.7 LOOSELY LAID AND BALLASTED MEMBRANE ROOFING INSTALLATION

A. Loosely lay 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. Comply with requirements in SPRI RP-4 for System 1.
D. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
E. Accurately align roof membrane, without stretching, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
F. Adhere perimeter of roof membrane according to requirements in SPRI RP-4.
G. Adhere roof membrane at corners, perimeters, and transitions according to requirements in SPRI RP-4.
   1. At corners and perimeters, adhere a second layer of roof membrane
H. Apply roof membrane with side laps shingled with slope of deck where possible.
I. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.
   1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
   2. Apply lap sealant and seal exposed edges of roofing terminations.
   3. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.
J. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.
   1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
   2. Apply lap sealant and seal exposed edges of roofing terminations.
K. 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.
L. Leave seams uncovered until inspected by roofing system manufacturer.
M. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
N. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

O. Install protection mat over roof membrane, overlapping a minimum of 6 inches. Install an additional protection mat layer at projections, pipes, vents, and drains, overlapping a minimum of 12 inches.

P. Aggregate Ballast: Apply uniformly over roof membrane at the rate required by roofing system manufacturer, but not less than the following, spreading with care to minimize possibility of damage to roofing system. Lay ballast as roof membrane is installed, leaving roof membrane ballasted at end of workday.
   1. Ballast Weight: Size 2 aggregate, minimum rate of 1,300 pounds per 100 square feet or 13 pounds per square feet, at corners and perimeter; Size 4 aggregate, minimum rate of 1000 pounds per 100 square feet or 10 pounds per square feet field.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will 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. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
      a. Perform tests before overlying construction is placed.
      b. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
      c. Flood each area for 24 hours.
      d. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.  
         1) Cost of retesting is Contractor's responsibility.
      e. Testing agency shall prepare survey report indicating locations initial leaks, if any, and final survey report.
   2. Infrared Thermography: Testing agency shall survey entire roof area using infrared color thermography according to ASTM C 1153.
      a. Perform tests before overlying construction is placed.
      b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
   1) Cost of retesting is Contractor's responsibility.

d. Testing agency shall prepare survey report of initial scan indicating locations of entrapped moisture, if any.

3. Testing agency shall prepare survey report indicating locations of initial discontinuities, if any.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.

D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _______________________________ of ___________________________, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
   1. Owner: <Insert name of Owner>.
   2. Address: <Insert address>.
   3. Building Name/Type: <Insert information>.
   4. 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 72 mph;
   c. fire;
   d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. vapor condensation on bottom of roofing; and
   g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

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
SECTION 07 54 16 - KETONE ETHYLENE ESTER (KEE) ROOFING (ALTERNATE 1)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Adhered ketone ethylene ester (KEE) roofing system.
   2. Loosely laid and ballasted, ketone ethylene ester (KEE) roofing system.
   3. Roof insulation.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
   3. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in 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 roof deck construction, conduct conference at Project site.
   1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
   5. Review structural loading limitations of roof deck during and after roofing.
   6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
   7. Review governing regulations and requirements for insurance and certificates if applicable.
   8. Review temporary protection requirements for roofing system during and after installation.
   9. Review roof observation and repair procedures after roofing installation.
B. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Include plans, elevations, 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. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
C. Samples for Verification: For the following products:
   1. Roof membrane and flashing, of color required.
   2. Aggregate surfacing material in gradation and color required.
D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.5 INFORMATIONAL SUBMITTALS
A. Qualification Data: For Installer and manufacturer.
B. Manufacturer Certificates:
      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. Evaluation Reports: For components of roofing system, from ICC-ES.
D. Field Test Reports:
   1. Concrete internal relative humidity test reports.
   2. Fastener-pullout test results and manufacturer's revised requirements for fastener
      patterns.
E. Field quality-control reports.
F. Sample Warranties: For manufacturer's special warranties.

1.6 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.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed 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.

1.8 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.

1.9 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.

1.10 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, 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 and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and base flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): <Insert lbf/sq. ft.>.

2. Zone 2 (Roof Area Perimeter): <Insert lbf/sq. ft.>.
   a. Location: From roof edge to <Insert dimension> inside roof edge.

3. Zone 3 (Roof Area Corners): <Insert lbf/sq. ft.>.
   a. Location: <Insert dimension> in each direction from building corner.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class I or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-90.

2. Hail-Resistance Rating: SH.

E. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 64 or initial SRI not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

F. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low -slope roof products.

G. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

H. Exterior Fire-Test Exposure: ASTM E 108 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.

I. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.
2.2 KETONE ETHYLENE ESTER (KEE) ROOFING

   1. Basis-of-Design Product: Subject to compliance with requirements, provide Garland
      KEE-Stone Two-ply Thermoplastic Cap Sheet and Modified Base Sheet or
      comparable product by one of the following:
         b. Seaman Corporation.
   2. Thickness: 60 mils, nominal. Owner may elect to reduce to 45 mil membrane.

B. Source Limitations: Obtain components for roofing system from manufacturer of roof
   membrane or manufacturer approved by roof membrane manufacturer.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended
   use and compatible with other roofing components.
B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type,
   reinforcement, thickness, and color as KEE sheet.
C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
D. Bonding Adhesive: Manufacturer's standard.
E. Slip Sheet: ASTM D 2178/D 2178M, Type IV, glass fiber, asphalt-impregnated felt.
F. Vented Base Sheet: ASTM D 4897/D 4897M, Type II; nonperforated, asphalt-impregnated
   fiberglass reinforced, with mineral granular patterned surfacing on bottom surface.
G. 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 stainless steel fasteners with neoprene washers.
H. 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.
I. 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 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by KEE roof
   membrane manufacturer.
B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or
   glass-fiber mat facer on both major surfaces.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers
      offering products that may be incorporated into the Work include, but are not limited
      to, the following:
         b. Carlisle SynTec Incorporated.
         c. Firestone Building Products.
         d. GAF Materials Corporation.
         e. Johns Manville; a Berkshire Hathaway company.
         f. Rmax, Inc.
   2. Compressive Strength: 20 psi.
   3. Size: 48 by 48 inches and/or 48 by 96 inches or a combination thereof.
4. Thickness:
   b. Upper Layer: At thickness required to achieve minimum R25 continuous insulation but not less than 3 inches.

2.5 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

B. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board, or ASTM C 1278/C 1278M fiber-reinforced gypsum board.

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. CertainTeed Corporation; GlasRoc Roof Board.
   b. Georgia-Pacific Building Products; Dens Deck.
   c. National Gypsum Company; DEXcell FA Glass Mat Roof Board.
   d. United States Gypsum Company; Securock Glass Mat Roof Board.

2. Thickness: 1/2 inch.


2.6 ASPHALT MATERIALS

A. Roofing Asphalt: ASTM D 312/D 312M, Type III or Type IV ASTM D 6152/D 6152M, SEBS modified.

2.7 BALLAST

A. Aggregate Ballast: Smooth, washed, riverbed gravel or other acceptable smooth-faced stone that withstands weather exposure without significant deterioration and does not contribute to membrane degradation, of the following size:


2. Size: ASTM D 448, Size 2, ranging in size from 1-1/2 to 2-1/2 inches.

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 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 F 2170.

   a. Test Frequency: One test probe per each 1000 square feet of roof deck, with no fewer than three test probes.

   b. Submit test reports within 24 hours of performing tests.

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.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install replacement substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows. Isolated substrate replacements must fit appropriately to completely fill damaged or deteriorated areas.

1. Tightly butt substrate boards together.

2. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

3. Attach substrate board over existing concrete roof deck matching existing wood decking substrate board conditions, (mopped in place, adhered or mechanically attached).

3.5 INSULATION INSTALLATION

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. Installation Over Metal Decking:

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.

   a. Locate end joints over crests of decking.

   b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

   c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

   d. Make joints between adjacent insulation boards not more than 1/4 inch in width.

   e. At 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.

   1) Trim insulation so that water flow is unrestricted.
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f. Fill gaps exceeding 1/4 inch with insulation.
g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
   1) Loosely lay base layer of insulation units over mopped on base sheet mopped on to existing wood deck substrate.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
f. Trim insulation so that water flow is unrestricted.
g. Fill gaps exceeding 1/4 inch with insulation.
h. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
i. Loosely lay each layer of insulation units over substrate.
j. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
   1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 degrees F of equiviscous temperature.

D. Installation Over Wood Decking:
1. Mechanically fasten slip sheet to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to wood decks.
a. Fasten slip sheet to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install base layer of insulation with joints staggered not less than 24 inches 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 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.
   1) Trim insulation so that water flow is unrestricted.
e. Fill gaps exceeding 1/4 inch with insulation.
f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
g. Hot mop base layer insulation units over base sheet and wood deck substrate.

3. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
   1) Trim insulation so that water flow is unrestricted.
f. Fill gaps exceeding 1/4 inch with insulation.
g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
h. Hot mop each additional layer of insulation units over base insulation layer.
i. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
   1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 degrees F of equiviscous temperature.

3.6 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
   1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   2. At internal roof drains, conform to slope of drain sump.
      a. Trim cover board so that water flow is unrestricted.
   3. Cut and fit cover board tight to nailers, projections, and penetrations.
   4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
      a. Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 degrees F of equiviscous temperature.
B. Install slip sheet over cover board and immediately beneath roof membrane.

3.7 LOOSELY LAID AND BALLASTED ROOFING INSTALLATION

A. Loosely lay 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. Comply with requirements in SPRI RP-4 for System 1.
D. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
E. Accurately align roof membrane, without stretching, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
F. Adhere perimeter of roofing according to requirements in SPRI RP-4.
G. Adhere roof membrane at corners, perimeters, and transitions according to requirements in SPRI RP-4.
   1. At corners and perimeters, adhere a second layer of roof membrane.
H. Apply roof membrane with side laps shingled with slope of deck where possible.
I. 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.
   2. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
   3. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
   4. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
J. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.
K. Install protection mat over roof membrane, overlapping a minimum of 6 inches. Install an additional protection mat layer at projections, pipes, vents, and drains, overlapping a minimum of 12 inches.
L. Aggregate Ballast: Apply uniformly over roof membrane at the rate required by roofing system manufacturer, but not less than the following, spreading with care to minimize possibility of damage to roofing system. Lay ballast as roof membrane is installed, leaving roofing ballasted at the end of the workday.
   1. Ballast Weight: Size 2 aggregate, 13 pounds per square feet, at corners and perimeter; Size 4 aggregate, 10 pounds per square feet, elsewhere.
M. Roof-Paver and Aggregate Ballast: Install heavyweight roof pavers according to manufacturer's written instructions on roof corners and perimeter.

3.8 BASE FLASHING INSTALLATION

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.

3.9 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. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
      a. Perform tests before overlying construction is placed.
      b. Flood to an average depth of 2-1/2 inches with a minimum depth of [1 inch] >Insert depth< and not exceeding a depth of [4 inches] >Insert depth>. Maintain 2 inches of clearance from top of base flashing.
      c. Flood each area for 24 hours.
d. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.
   1) Cost of retesting is Contractor's responsibility.
e. Testing agency shall prepare survey report indicating locations of initial leaks, if any, and final survey report.

2. Infrared Thermography: Testing agency shall survey entire roof area using infrared color thermography according to ASTM C 1153.
   a. Perform tests before overlying construction is placed.
   b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
   c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
      1) Cost of retesting is Contractor's responsibility.
   d. Testing agency shall prepare survey report of initial scan indicating locations of entrapped moisture, if any.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.

D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

A. WHEREAS ________________ of __________________________, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner: <Insert name of Owner>.
2. Address: <Insert address>.
3. Building Name/Type: <Insert information>.
4. 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,
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 <Insert mph>;
   c. fire;
   d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. vapor condensation on bottom of roofing; and
   g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

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
SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Formed roof-drainage sheet metal fabrications.
   2. Formed low-slope roof sheet metal fabrications.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
   1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
   2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
   1. Design Pressure: Minimum 35psf FIELD, Minimum 62psf PERIMETER, Minimum 92psf CORNERS.
FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.

2.2 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
   1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
   2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
   4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
   5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:
   1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
   2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
   1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
   2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams:
   1. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces.
2.3 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates. Shop fabricate interior and exterior corners.
   2. Fabricate from the following materials:
      a. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
   1. Coping Profile: [Fig. 3-4A] [Fig. 3-4B] [Fig. 3-4C] [Fig. 3-4D] [Fig. 3-4E] [Fig. 3-4F] [Fig. 3-4G] in accordance with SMACNA's "Architectural Sheet Metal Manual."
   2. Fabricate from the following materials:
      a. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch thick.

C. Roof-to-Roof Edge-Flashing and Fascia-Cap Transition Shop fabricate interior and exterior corners. Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.034 inch thick.

D. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
   1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

E. Counterflashing: Fabricate from the following materials:
   1. Galvanized Steel: [0.022 inch] <Insert dimension> thick.

F. Flashing Receivers: Fabricate from the following materials:
   1. Galvanized Steel: 0.022 inch thick.

G. Roof-Penetration Flashing: Fabricate from the following materials:
   1. Galvanized Steel: 0.028 inch thick.

H. Roof-Drain Flashing: Fabricate from the following materials:
   1. Stainless Steel: [0.016 inch] <Insert dimension> thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
8. Do not field cut sheet metal flashing and trim by torch.
9. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
3. Use lapped expansion joints only where indicated on Drawings.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated.
   a. Embed hooked flanges of joint members not less than 1 inch into sealant.
   b. Form joints to completely conceal sealant.
   c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
   d. Adjust setting proportionately for installation at higher ambient temperatures.
      1) Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

F. Rivets: Rivet joints in uncoated aluminum where necessary for strength.
3.3 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
   1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
   2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:
   1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
   2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
   3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:
   1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
   2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.
      a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.
      b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
   3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
   1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
   2. Extend counterflashing 4 inches over base flashing.
   3. Lap counterflashing joints minimum of 4 inches.
   4. Secure in waterproof manner by means of anchor and washer spaced at 12 inches o.c. along perimeter and 6 inches o.c. at corners areas unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with sealant and clamp flashing to pipes that penetrate roof.

3.4 INSTALLATION OF WALL FLASHINGS

A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
3.5 INSTALLATION OF MISCELLANEOUS FLASHING

A. Equipment Support Flashing:
   1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
   2. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans:
   1. Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings.
   2. Pipe and install drain line to plumbing waste or drainage system.

3.6 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
B. Clean and neutralize flux materials. Clean off excess solder.
C. Clean off excess sealants.

3.8 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer’s written installation instructions.
B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
C. Maintain sheet metal flashing and trim in clean condition during construction.
D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION
SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Roof hatches.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 05 50 00 "Metal Fabrications" for metal vertical ladders, ships' ladders, and stairs for access to roof hatches.

1.2 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
B. Shop Drawings: For roof accessories.
   1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
C. Delegated-Design Submittal: For indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
   2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.
1.6 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
B. Wind-Restraint Performance: 115mph per ASCE 7-10 (Calculated in accordance with Ch 26 -31).

2.2 ROOF HATCHES

A. Roof Hatches: Metal roof-hatch units with lids and insulated -walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, and integrally formed deck-mounting flange at perimeter bottom.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Babcock-Davis.
      b. Bilco Company (The).
   B. Type and Size: Single-leaf lid, 30 by 54 inches.
   C. Loads: Minimum 40-lbf per square foot external live load and internal uplift load.
   D. Hatch Material: Zinc-coated (galvanized) steel sheet.
      1. Thickness: Manufacturer's standard thickness for hatch size indicated.
      2. Finish: Factory rust inhibiting primer coating with baked enamel or powder coating.
      3. Color: As indicated by manufacturer's designations.
   E. Construction:
      1. Insulation: 1-inch-thick, cellulosic-fiber board.
         a. R-Value: 4.3 according to ASTM C 1363.
      3. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
      4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
      5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
      6. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
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F. Hardware: Spring operators, hold-open arm, galvanized stainless-steel spring latch with turn handles, steel butt- or pintle-type hinge system, and padlock hasps inside and outside.

G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
   1. Height: 42 inches above finished roof deck.
   2. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter.
   3. Flat Bar: Galvanized steel, 2 inches high by 3/8 inch thick.
   4. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
   5. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
   6. Fabricate joints exposed to weather to be watertight.
   7. Fasteners: Manufacturer's standard, finished to match railing system.
   8. Finish:
      a. Color: Match existing manufacturer standard paint color.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 pounds per cubic foot, thermal resistivity of 4.3 degrees F by height by square feet per Btu by inches at 75 degrees F, thickness as indicated.

C. Polyisocyanurate Board Insulation: ASTM C 1289, thickness and thermal resistivity as indicated.

D. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.

E. Security Grilles: 3/4-inch diameter, ASTM A 1011/A 1011M steel bars spaced o.c. in one direction and o.c. in the other; factory finished as follows:
   1. Surface Preparation: Remove mill scale and rust, if any, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
   2. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment.
   3. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chrome-free, universal primer; selected for resistance to normal atmospheric corrosion, for compatibility with substrate and field-applied finish paint system indicated, and for capability to provide a sound foundation for field-applied topcoats under prolonged exposure.

F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
C. Verify dimensions of roof openings for roof accessories.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.
   1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
   2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
   3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
   4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
B. Roof-Hatch Installation:
   1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
   2. Attach safety railing system to roof-hatch curb.
   3. Attach ladder-assist post according to manufacturer's written instructions.
C. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 91 13 "Exterior Painting."
C. Clean exposed surfaces according to manufacturer's written instructions.
D. Clean off excess sealants.
E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION
SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nonstaining silicone joint sealants.
   2. Mildew-resistant joint sealants.
   3. Latex joint sealants.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 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. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.4 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. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
   4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
   6. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.
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.
      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.

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 degrees 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.

WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.
B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.
C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.
PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's standard range. Do not paint sealants to achieve color.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide the following:
   a. Dow Corning Corporation; 756 SMS or 795.
   b. GE Construction Sealants; Momentive Performance Materials Inc; SilPruf NB.
   c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 295 FPS NB.
   d. Pecora Corporation; 864NST, 895NST, or 898NST.
   e. Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.3 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide the following:
   a. Dow Corning Corporation; 786-M.
   b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
   c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.
   d. Soudal USA; RTV GP.
   e. Tremco Incorporated; Tremsil 200.
2.4 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. BASF Construction Chemicals - Building Systems.
      b. Construction Foam Products, a division of Nomaco, Inc.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
   a. Unglazed surfaces of ceramic tile.
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.

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 joint sealants and of products in which joints occur.

3.5 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.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Tile control and expansion joints.
      c. Vertical joints on exposed surfaces of unit masonry, concrete, walls, and partitions.
      d. Joints on underside of plant-precast structural concrete beams and planks.
   2. Joint Sealant:
      a. Silicone, nonstaining, S, NS, 50, NT.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      b. Tile control and expansion joints where indicated.
   2. Joint Sealant:
      a. Silicone, mildew resistant, acid curing, S, NS, 25, NT.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION
SECTION 08 03 51.23 - HISTORIC TREATMENT OF STEEL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment of steel windows in the form of the following:
   1. **BASE BID:** Replacement of steel window frame assemblies with thermally broken steel window frames meeting 2015 IECC Energy Code requirements but historically matching the aesthetic and function of the existing Fixed and Casement + Fixed combination steel true divided lite steel window frames.
   2. **ALTERNATE BID ITEM:** Replacement of steel window frame assemblies with thermally broken, fixed steel window frames meeting 2015 IECC Energy Code requirements. All replacement steel windows are to aesthetically match the existing steel, true divided lite steel window frames.
   3. Reglazing with new, true divided insulated glass units.
   4. Replacing hardware.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 35 91 "Historic Treatment Procedures" for general historic treatment requirements.
   3. Section 02 42 96 "Historic Removal and Dismantling" for historic removal and dismantling work.
   4. Section 08 51 23.23 "Cold-Rolled Steel Windows" for product and performance requirements of energy efficient, thermally broken steel replacement windows.
   5. Section 08 80 00 "Glazing" for product and performance requirements of new, energy efficient insulated glass units.

1.2 ALLOWANCES

A. Allowances for historic treatment of steel windows are specified in Section 01 21 00 "Allowances."
   1. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.
   2. Perform work that exceeds quantity allowances only as authorized by Change Orders.

1.3 DEFINITIONS

A. Glazing: Includes glass, glazing clips, glazing tapes, glazing sealants, and glazing compounds.
B. Window: Includes window frame, sash and muntins, hardware, and insect screens (if applicable) unless otherwise indicated by context.
C. Steel Window Component Terminology: Steel window components for historic treatment work are welded together from steel shapes and include the following classifications:
   1. Subframe: Steel anchorage, usually built into wall construction.
1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference on historic treatment of steel windows at Project site.
   1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of steel windows.
   2. Review methods and procedures related to historic treatment of steel windows, including, but not limited to, the following:
      a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, salvage materials, material application, sequencing, tolerances, and required clearances.
      c. Fire-protection plan.
      d. Steel window historic treatment program.
      e. Coordination with building occupants.

1.5 SEQUENCING AND SCHEDULING

A. Perform historic treatment of steel windows in the following sequence, which includes work specified in this and other Sections:
   1. Label each new window frame with permanent opening-identification number in inconspicuous location.
   2. Remove existing window frames.
   3. Remove caulk and sealant residue from perimeter masonry and concrete.
   4. Dismantle unused window accessory hardware from masonry or concrete and repair holes according to requirements in other Sections.
   5. Install temporary protection and security at window openings.
   6. Clean surfaces.
   7. Remove temporary protection and security at window openings.
   8. Install and adjust new units.
   9. Install glazing.
   10. Apply finish coats.
   11. Install hardware.
   12. Install weather stripping if any.
   13. Seal perimeter joints between frames and adjacent finishes according to requirements in other Sections.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include recommendations for product application and use.
B. Shop Drawings: Include plans, elevations, and sections showing locations and extent of repair and replacement work, with enlarged details of replacement parts indicating materials, profiles, connections, reinforcing, method of splicing into or attaching to existing steel window, accessory items, and finishes. Include field-verified dimensions and the following:
   1. Schedule of window and sash repairs, using same reference number for openings as those on Contract Drawings.
   2. Full-size shapes and profiles with complete dimensions for replacement components and their connections, showing relationship of existing components to new components.
3. Details of temporary protection and security at window openings.
4. Templates and directions for installing storm windows if any.
5. Identification of each new unit and its corresponding window locations in the building on annotated plans and elevations.
6. Hardware schedule using same reference numbers for openings.
7. Provisions for sealant joints, flashing and gasketing as required for location.

C. Samples for Initial Selection: For each type of exposed finish.
1. Include Samples of hardware and accessories involving color selection.

D. Samples for Verification: For the following products in manufacturer's standard sizes unless otherwise indicated, finished as required for use in the Work:
1. Replacement Units: 12-inch-long, full-size frame mullion sections with shop-applied finish.
2. Hardware: Full-size units with each shop-applied or restored finish.
3. Weather Stripping: 12-inch-long section of mated steel members with weather stripping.
4. Glass: Full-size 12x12 units of each type and appearance.

1.7 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic steel window specialist, experienced in replacing steel windows in whole. Experience only in fabricating and installing new steel windows is insufficient experience for steel window historic treatment work.

B. Steel Window Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site.
1. If materials and methods other than those indicated are proposed for any phase of historic treatment 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.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, broken, or otherwise damaged.

B. Store products inside a well-ventilated area and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity, and where environmental conditions comply with manufacturer's requirements.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with historic treatment of steel windows only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

PART 2 - PRODUCTS

2.1 REPLICATED STEEL WINDOW UNITS

A. Steel Windows: Refer to Section 08 51 23.23 "Cold-ROLled Steel Windows".
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95% Construction Documents

B. Replicated Steel Window Frames: Replacement, welded-steel units matching existing units; custom fabricated from salvaged windows, new steel shapes, or a combination thereof; and with operating and latching hardware.
   1. Manufacturers: Subject to compliance with requirements, provide products fabricated by the historic treatment specialist firms.
   2. Steel Window Members: Match profiles and detail of existing window members.
   3. Exposed Hardware: Match existing exposed window hardware.

2.2 GLAZING MATERIALS

A. Glass: See Section 08 80 00 "Glazing."
B. Glazing Systems:
   1. Modern Glazing Products: Glazing pockets and single-component polyurethane glazing compound; ASTM C 920, Type S, Grade NS, Class 25, Use G; struck uniformly to match taper of existing glazing putty (removed); colored as required to match painted sash.

2.3 HARDWARE

A. Window Hardware: Provide complete sets of window hardware consisting of hinges, pulls, latches, and accessories indicated for each window or required for proper operation. Sets shall include replacement hardware to complement repaired and refinished existing hardware. Window hardware shall smoothly operate, tightly close, and securely lock steel windows and be sized to accommodate sash weight and dimensions.

2.4 STEEL WINDOW FINISHES

A. Shop-Finished Units: Marine Grade Paint finish system consisting of primer and two finish coats on exposed exterior and interior surfaces.
   1. Finish Coats: Match existing paint color or Owner's required color.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect adjacent materials from damage by historic treatment of steel windows. Construction Manager to coordinate abatement of identified hazardous materials prior to installation of replacement windows.

3.2 HISTORIC TREATMENT OF STEEL WINDOWS, GENERAL

A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the window interior at 5 feet away and from the window exterior at 20 feet away.
B. Replace Steel Units: Replace existing units with thermally broken, energy efficient units made from 100 percent recyclable new steel shapes matching size and form of existing window frames, sashes and muntin shapes.
C. Protection of Openings: Where sash or windows are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.
D. Identify removed windows, frames, sash, and components with numbering system corresponding to window locations to ensure reinstallation in same location. Key windows, sash, and components to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.3 GLAZING

A. Comply with combined written instructions of manufacturers of glass, glazing system, and glazing materials unless more stringent requirements are indicated.
B. Remove glass and glazing from openings and prepare surfaces for reglazing.
C. Prime steel, including glazing rabbets, with finish-paint primer before installing glass.
D. Size glass as required by Project conditions to provide necessary bite on glass and minimum edge and face clearances with reasonable tolerances.
E. Install setting bead, side beads, and back bead in glazing pockets before setting glass.
F. Install glass with proper orientation so that coatings, if any, face exterior or interior as required.
G. Disposal of Removed Glass: Remove from Owner's property and legally dispose of it unless otherwise indicated.

3.4 STEEL WINDOW UNIT REPLACEMENT

A. General: Replace existing window frame units with replicated steel units to match existing at locations indicated on Drawings.
B. Install units, hardware, accessories, and other components as indicated on Drawings.
C. Install units level, plumb, square, true to line, without distortion or impeding movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
D. Metal Protection: Separate aluminum and other corrodeable surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
E. Anchor Concealment: Fill screw head depressions flush and smooth with paintable putty after window installation, spot prime, and paint.
F. Disposal of Removed Units: Remove from Owner's property and legally dispose of them or deliver as salvage to Owner for storage as directed by Owner.

3.5 WEATHER STRIPPING INSTALLATION

A. General: Install weather stripping for tight seal between sash and frame as determined by preconstruction testing and demonstrated in mockup.
B. Curing: Allow sealants to cure in closed-window joints.

3.6 ADJUSTMENT

A. Adjust existing and replacement operating sash, insect screens, hardware, weather stripping, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
3.7 CLEANING AND PROTECTION

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.

B. Clean exposed surfaces immediately after historic treatment of steel windows. Avoid damage to coatings and finishes. Remove excess sealants, glazing and repair materials, dirt, and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.8 HISTORIC STEEL WINDOW REPLACEMENT SCHEDULE

A. Refer to drawings for scheduled windows.

END OF SECTION
SECTION 08 11 13 - HOLLOW METAL DOOR FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow-metal work.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 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.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, and finishes.
B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
   8. Details of moldings, removable stops, and glazing.
   9. Details of conduit and preparations for power, signal, and control systems.
C. Samples for Verification:
   1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
   2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
      a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
      b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

D. Schedule: Provide a schedule of hollow-metal work 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 DELIVERY, STORAGE, AND HANDLING
   A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
      1. Provide additional protection to prevent damage to factory-finished units.
   B. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 INTERIOR DOORS AND FRAMES
   A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
   B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2. At locations indicated in the Door and Frame Schedule.
      1. Physical Performance: Level B according to SDI A250.4.
      2. Doors:
         a. Type: As indicated in the Door and Frame Schedule.
         c. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
2.3 FRAME ANCHORS

A. Jamb Anchors:
   1. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.4 MATERIALS

A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

B. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

D. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

F. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

G. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. 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 butt welding.
   2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.

5. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

6. Door Silencers: Drill stops to receive door silencers where specified in Section 08 71 00. Keep holes clear during construction.

C. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
   1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
   2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
   1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
   2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
   3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
   4. Provide loose stops and moldings on inside of hollow-metal work.
   5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.6 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

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 roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
   a. At fire-rated openings, install frames according to NFPA 80.
   b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   c. Install frames with removable stops located on secure side of opening.
   d. Install door silencers in frames before grouting.
   e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

3. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.

4. 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.

5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.
3.4 REPAIR OF EXISTING FRAMES

A. Install frame manufacturer's standard filler plates at abandoned [hinge] [and strike] mortises.
   1. Weld in place and grind smooth with invisible edges.
B. Fill abandoned screw holes in frames with body putty. Sand smooth with feathered, invisible edges.
   1. New hardware reinforcements.
   2. Make cut-outs in frames with straight lines and square corners.
   3. Maintain maximum 1/16 inch between edge of new cut-out and new hardware.
   4. Provide hardware reinforcements to comply with requirements of referenced standards.
   5. Weld reinforcements in place and grind smooth with invisible edges.

3.5 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
B. Remove grout and other bonding material from hollow-metal work immediately after installation.
C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION
SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid-core doors with wood-veneer faces.
   2. Flush wood doors.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
   1. Dimensions and locations of blocking.
   2. Dimensions and locations of mortises and holes for hardware.
   3. Dimensions and locations of cutouts.
   4. Undercuts.
   5. Requirements for veneer matching.
   6. Fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection.

D. Samples for Verification:
   1. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
      a. Provide Samples for each species of veneer and solid lumber required.
      b. Provide Samples for each color, texture, and pattern of plastic laminate required.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI’s Quality Certification Program.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.
1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 degrees F and relative humidity between 25 and 55 percent during remainder of construction period.

1.7 WARRANTY

A. 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. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   4. Warranty Period for Hollow-Core Interior Doors: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Algoma Hardwoods, Inc.
   2. Ampco.
   3. Graham Wood Doors; an Assa Abloy Group company.
   4. Vancouver Door Company.
   5. VT Industries, Inc.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards WDMA I.S.1-A, "Architectural Wood Flush Doors."
   1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
   2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.

B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
C. WDMA I.S.1-A Performance Grade:
   1. Heavy Duty unless otherwise indicated.
   2. Extra Heavy Duty: public toilets and bathing/shower rooms.

D. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
   2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
   3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
      a. Finish steel edges and astragals with baked enamelsame color as doors.
      b. Finish steel edges and astragals to match door hardware (locksets or exit devices).

E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

F. Mineral-Core Doors:
   1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
   2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
      a. 5-inch top-rail blocking.
      b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
      c. 5-inch midrail blocking, in doors indicated to have armor plates.
      d. 5-inchmidrail blocking, in doors indicated to have exit devices.
   3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:
   1. Grade: Premium, with Grade AA faces.
   2. Species: Select White Birch or Red oak. Match existing flush wood door species.
   3. Cut: Plain sliced (flat sliced).
   5. Assembly of Veneer Leaves on Door Faces: Center-balance match.
   6. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
   7. Exposed Verticaland Top Edges: Same species as faces or a compatible species - edge Type A.
   8. Core: Either glued wood stave or structural composite lumber.
   9. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
  10. Construction: Seven plies, either bonded or nonbonded construction.
11. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.4 FABRICATION

A. Openings: Factory cut and trim openings through doors.
   1. Louvers: Factory install louvers in prepared openings.

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 08 71 00 "Door Hardware."
B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
   1. Install fire-rated doors according to NFPA 80.
   2. Install smoke- and draft-control doors according to NFPA 105.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
      a. Comply with NFPA 80 for fire-rated doors.
   2. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

3.3 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
SECTION 08 51 23.23 - STEEL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes thermally broken, energy efficient windows from steel members.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements for cold-rolled steel windows, including, but not limited to, the
      following:
      a. Coordinating finishing of cold-rolled steel windows with other work where
         color and finish matching is indicated.
      b. Coordinating cold-rolled steel windows with other exterior wall components,
         including anchorage, glazing, flashing, weeping, sealants, and protection of
         finishes.
      c. Sequencing work to construct a watertight and weathertight exterior building
         enclosure.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, fabrication methods, dimensions
      of individual components and profiles, hardware, finishes, and operating
      instructions.

B. Shop Drawings:
   1. Include plans, elevations, sections, and details.
   2. Detail attachments to other work, and between units, if any.
   3. Include hardware and required clearances.
   4. Mullion and muntin details, including reinforcement and stiffeners.
   5. Flashing details.
   7. Accessories.

C. Samples for Initial Selection: For units with factory-applied color finishes.
   1. Include similar Samples of hardware and accessories involving color selection.

D. Samples for Verification: For each type of cold-rolled steel window.
   1. Main Framing, Sash and Muntin Members: Full-sized sections 12 inches long,
      with factory-applied color finish, weather stripping, and glazing bead.
   2. Hardware: Full-size units with factory-applied finish.

E. Product Schedule: For cold-rolled steel windows. Use same designations indicated on
   Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer manufacturer.
Product Test Reports: For cold-rolled steel windows, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For cold-rolled steel windows to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating cold-rolled steel windows that meet performance requirements indicated and of documenting performance by labels, test reports, and calculations.
B. Installer Qualifications: An installer acceptable to window manufacturer for installation of units required for this Project.
C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical wall area as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of cold-rolled steel windows that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.
      b. Structural failures, including excessive deflection.
      c. Excessive water leakage or air infiltration.
      d. Faulty operation of operable sash and hardware.
      e. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   2. Warranty Period:
      a. Window: 20 years from date of Substantial Completion.
      b. Finish: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Portella Steel Doors & Windows (Artisan Series; TB (Thermally Broken) with true divided lites).
   2. Dynamic Architectural Windows & Doors, Inc. (Steel-Arte Series; thermally broken with true divided lites).
2.2 PERFORMANCE REQUIREMENTS

A. SWI Standards: Comply with applicable requirements in SWI's "The Architect's Guide to Steel Windows and Doors" and "Specifications: Cold-Rolled," except where more stringent requirements are indicated.

B. Structural Wind Loads: Wind lateral loads per ASCE 7-10 with Basic Wind Speed (120 Ultimate), Exposure C, Risk Category III.

C. Deflection Limits: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressures.

D. Structural: Test according to ASTM E 330 as follows:
   1. When tested at positive and negative wind-load design pressures, cold-rolled steel windows do not evidence deflection exceeding specified limits.
   2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
   3. Test Durations: As required by design wind velocity, but not less than 30 seconds.

E. Air Infiltration: Not more than 0.37 cfm/ft. of sash crack length at an inward test pressure of 6.24 lbf/sq. ft. when tested according to ASTM E 283.

F. Water Penetration: No leakage for 15 minutes when window is subjected to a rate of flow of 5 gal./h/sq. ft. with a differential pressure across the window of 2.86 lbf/sq. ft. when tested according to ASTM E 331.

G. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.60 Btu/sq. ft. x h x deg F.

H. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.25.

I. Condensation Resistance: Provide cold-rolled steel windows with a CRF when tested according to AAMA 1503 of 40 minimum.

J. Thermal Movements: Provide cold-rolled steel windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

K. Temperature Change: 120 degrees F, ambient; 180 degrees F material surfaces.

L. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.

M. Windborne-Debris Impact Resistance: Passes ASTM E 1886 missile-impact and cyclic-pressure tests in accordance with ASTM E 1996 for Wind Zone 1 for basic protection.
   1. Large-Missile Test: For glazing located within 30 feet of grade.
   2. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.

N. Fire-Test-Response Characteristics: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 GLAZING

A. Glass and Glazing System: See Section 08 80 00 "Glazing" for glass units and glazing requirements for cold-rolled steel windows.
2.4 HARDWARE

A. General: Provide manufacturer's standard, malleable-ironhardware, with operating components of stainless steel, carbon steel complying with AAMA 907, brass, bronze, or other corrosion-resistant material designed to smoothly operate, tightly close, and securely lock cold-rolled steel window sash; and sized to accommodate sash weight and dimensions.

B. Casement Window Hardware:
   1. Lock: Combination lever-handle and cam-type latch.
   2. Steel Post in Barrel with Ball Bearings
   3. Lock: Lever-handle and cam-action lock with keeper.
   4. Limit Device: Adjustable, concealed friction adjustor/stay-bar with release key or tool.

2.5 ACCESSORIES

A. Fasteners: Provide fasteners of bronze, brass, stainless steel, or other metal that are warranted by manufacturer to be noncorrosive and compatible with trim, hardware, anchors, and other components of cold-rolled steel windows.

B. Anchors, Clips, and Window Accessories: Provide units of stainless steel, hot-dip zinc-coated steel, bronze, brass, or iron complying with ASTM A 123/A 123M. Provide units with sufficient strength to withstand design pressure indicated.
   1. Windborne-Debris-Impact Resistance: Provide anchors and clips of same design used to pass windborne-debris-impact-resistance testing.

C. Sealant: For sealants required within fabricated windows, provide manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.6 FABRICATION

A. General: Fabricate cold-rolled steel windows of type and in sizes indicated to comply with SWI standards. Include a complete system for assembly of components and anchorage of window units.

B. Provide units that are reglazable without dismantling framing.

C. Prepare windows for site glazing.

D. Subframes and Operable Sash: Formed of cold-rolled steel of profile indicated. Miter or cope corners, and weld and dress joints smooth.

E. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

F. Provide weep holes and internal water passages to conduct infiltrating water to the exterior.

G. Provide water-shed members above casement sash.

2.7 METALLIC-COATED STEEL SHEET FINISHES

A. Surface Preparation: Clean surfaces of oil and other contaminants. Use cleaning methods that do not leave residue. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A 780.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify rough-opening dimensions, levelness of sill plate and clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. SWI Publication: Comply with applicable requirements in SWI's "General Guidelines on the Installation of Steel Windows," except where more stringent requirements are indicated.

B. Comply with manufacturer's written instructions for installing windows, hardware, operators, accessories, and other components.

C. Windborne-Debris-Impact Resistance: Anchor cold-rolled steel windows required to have windborne-debris resistance to structure using method, anchor type, and anchor spacing identical to that used in windborne-debris-impact-resistance testing.

D. Install windows level, plumb, square, true to line, without distortion or impediment to thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

E. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.

F. Install windows and components to drain condensation, water-penetrating joints, and moisture migrating within windows to the exterior.

G. Separate corrodbile surfaces from sources of corrosion or electrolytic action at points of contact with other materials according to ASTM E 2112.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

B. Clean factory-finished steel surfaces immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes.

C. Protect window surfaces from contact with contaminating substances resulting from construction operations. Remove contaminants immediately according to manufacturer's written recommendations.

D. Refinish or replace windows with damaged finish.

END OF SECTION
SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Mechanical door hardware for the following:
      a. Swinging doors.
   2. Cylinders for door hardware specified in other Sections.

B. Related Requirements:
   1. Divisions 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Door: A hinged or sliding barrier at the entrance of a building or room.
B. Dutch Door: A door with two vertical leafs.
C. LDW: Less door width.
D. Leaf: A single independently moving panel of a door.
E. Pair: A door with two horizontal leafs.

1.3 COORDINATION

A. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction.
   1. Cast anchoring inserts into concrete.
B. Installation Templates: Distribute for doors, frames, and other work specified to be factory
   prepared. Check Shop Drawings of other work to confirm that adequate provisions are
   made for locating and installing door hardware to comply with indicated requirements.
C. 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.
D. Exit Devices and Door Lite: [Locate the exit device below the door lite frame on hollow
   metal and wood doors] [Locate the exit device below the door lite frame on hollow
   metal, wood, and aluminum doors] [Provide manufacturer's standard filler to extend
   exit device beyond door lite frames where door lites extend below exit device. Factory
   cut or form filler to match profile of exit device trim].

1.4 PREINSTALLATION MEETINGS

A. Keying Conference: Conduct conference at . Use the first option when access control is not
   within this contract.
   1. Incorporate conference decisions into keying schedule after reviewing door
      hardware keying system including, but not limited to, the following:
      a. Flow of traffic and degree of security required.
      b. Preliminary key system schematic diagram.
      c. Requirements for key control system.
      d. Address for delivery of keys.
1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
D. Deliver keys[ and permanent cores] to Owner by registered mail or overnight package service.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

2.3 SCHEDULED DOOR HARDWARE

A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.
   1. Door hardware is scheduled in Section 08 71 00.10 "Door Hardware Schedule."

2.4 HINGES

A. Hinges: BHMA A156.1.[ Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.]
   1. Non-Ferrous: Where scheduled, provide hinges with base metal of brass, bronze, or stainless steel 300 Series.
   2. Provide wide throw and swing clear hinges when dimensionally required.

2.5 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule and within this Article.
B. Lock Backset: 2-3/4 inches unless otherwise indicated.
C. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
   4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.
D. Bored Locksets: BHMA A156.2.
E. Mortise Locks: BHMA A156.13; Grade 1; stamped steel case with steel or brass parts; Series 1000.

2.6 DOOR SILENCERS
A. Door Silencers: BHMA A156.16, L03011.

2.7 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. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.8 FINISHES
A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule. Match lock or operating trim for finishes not scheduled. Refer to above for hinge non-ferrous requirement.
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. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights unless otherwise indicated or required to comply with governing regulations.

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.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of leaf height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated. Verify location with Architect.

1. Configuration: Provide with electrified door hardware.

3.3 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.

B. Occupancy Adjustment: Approximately 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.

3.4 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.

3.5 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.

3.6 DOOR HARDWARE SCHEDULE

A. Refer to Section 08 71 00.10 "Door Hardware Schedule."

END OF SECTION
SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Glass for:
      a. Windows.
      b. Doors.
      c. Storefront framing.
   2. Glazing sealants and accessories.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

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 according to ASTM C 1036.
D. Interspace: Space between lites of an insulating-glass unit.

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.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Glass Samples: For each type of ; 12 inches square.
   1. Insulating glass.
C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths. Install sealant samples between two strips of material representative in color of the adjoining framing system.
D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data:
   1. Installer.
   2. Manufacturers of insulating-glass units with sputter-coated, low-E coatings.
   3. Glass testing agency.
   4. Sealant testing agency.
B. Product Certificates: For glass.
C. Product Test Reports: For coated insulating glass and glazing sealants, for tests performed by a qualified testing agency.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
D. Preconstruction adhesion and compatibility test report.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Install glazing in mockups specified in [Section 08 41 13 "Aluminum-Framed Entrances and Storefronts"] [Section 08 51 13 "Aluminum Windows"] [Section 08 44 13 "Glazed Aluminum Curtain Walls"] <Insert Section number and title> to match glazing systems required for Project, including glazing methods.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
   2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
   3. Test no fewer than eight samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.
1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.11 WARRANTY

A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Glass Product: Subject to compliance with requirements, provide product indicated in glass schedules or comparable product by one of the following:

1. AGC Glass Company North America, Inc.
2. Cardinal Glass.
3. Guardian Industries Corp.
4. Pilkington North America Inc.
5. PPG Industries, Inc.
6. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

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 the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
2. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. by h by degrees F.
3. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.

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.
   1. GANA Publications: "Glazing Manual."

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 the thickness indicated.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C 1048, Type I, Class 1 (clear), Quality-Q3.
B. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
   1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
   2. Spacer: Manufacturer's standard spacer material and construction
2.6 GASKET GLAZING

A. Provide preformed gaskets for aluminum framing.
B. ASTM C 864 resilient type as recommended by glazing manufacturer for framing system furnished with extruded shape to suit glazing channel retaining slot.
C. Color selected by Architect from manufacturer's standard range of colors.

2.7 GLAZING TAPES

A. General: Provide glazing tape for interior hollow metal and wood doors and frames.
B. 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 C 1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
C. 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 the 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.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of 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: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
2.9 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 degrees F, ambient; 180 degrees F, 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.
   1. Locate spacers directly opposite each other on both inside and outside faces of glass.
      Install correct size and spacing to preserve required face clearances, unless gaskets
      and glazing tapes are used that have demonstrated ability to maintain required face
      clearances and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to
      sealant width. With glazing tape, use thickness slightly less than final compressed
      thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving
   sideways in glazing channel, as recommended in writing by glass manufacturer and
   according to 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 by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are
   flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch
   tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs.
   Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not
   lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting
   dense compression gaskets formed and installed to lock in place against faces of removable
   stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings
   exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in
   place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks,
   and press firmly against soft compression gasket by inserting dense compression gaskets
   formed and installed to lock in place against faces of removable stops. Start gasket
   applications at corners and work toward centers of openings. Compress gaskets to produce
   a weathertight seal without developing bending stresses in glass. Seal gasket joints with
   sealant recommended 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 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 come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 INSULATING GLASS SCHEDULE

A. Glass Type G01 at all Ground Level Openings (windows, doors and storefront lites): Low-E-coated, clear insulating glass.
   1. Overall Unit Thickness: 1 inch.
   2. Minimum Thickness of Each Glass Lite: 6 mm.
   3. Outdoor Lite: Tempered float glass with Low-E Coating on #2 surface.
   4. Interspace Content: Argon.
   5. Indoor Lite: Fully tempered float glass.
   7. Summer Daytime U-Factor: Maximum 0.60 U-Value.
   8. Solar Heat Gain Coefficient: Maximum 0.25 SHGC.
   9. Safety glazing required at entrances.

B. Glass Type G02 at all Ground level lites in main building entrances above 7'-0" and all Second Floor Openings: Low-E-coated, clear insulating glass.
   1. Overall Unit Thickness: 1 inch.
   2. Minimum Thickness of Each Glass Lite: 6 mm.
   3. Outdoor Lite: Annealed float glass with Low-E Coating on #2 surface.
   4. Interspace Content: Argon.
   5. Indoor Lite: Fully tempered float glass.
   7. Summer Daytime U-Factor: Maximum 0.60 U-Value.

END OF SECTION
SECTION 09 01 90.52 - MAINTENANCE REPAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes maintenance repainting as follows:
   1. Removing existing paint.
   2. Patching substrates.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 91 13 "Exterior Painting" for required paint system.
   3. Section 09 91 23 "Interior Painting" for required paint system.
   4. Section 09 96 00 "High-Performance Coatings" for scheduled paint materials and coating systems.

1.2 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 01 22 00 "Unit Prices."
   1. Unit prices apply to authorized work as designated by Owner's discretion.
   2. Unit prices apply to authorized additions to and deletions from Work as authorized by Change Orders.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.
H. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
I. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 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.

1.6 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; in sizes indicated below.
   1. Include stepped Samples defining each separate coat, including fillers and primers. Resubmit until each required sheen, color, and texture is achieved.
   2. For each painted color being matched to a standardized color-coding system, include the color chips from the color-coding-system company with Samples.
   3. Include a list of materials for each coat of each Sample.
   4. Label each Sample for location and application.
   5. Sample Size:
      a. Painted Surfaces: 4-by-8-inch Samples for each color and material, on hardboard.
C. Product List: For each paint product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Printout of current "MPI Approved Products List" for each MPI-product category specified in paint systems, with the proposed product highlighted.
   3. VOC content.

1.7 INFORMATIONAL SUBMITTALS

A. Color Matching Certificate: For computer-matched colors.

1.8 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.

1.9 QUALITY ASSURANCE

A. Color Matching: Custom computer-match paint colors to colors indicated on Drawings or as 'Match Existing Paint Color'. For colors indicated by a standardized coding system, obtain a color chip for each color indicated from the color-coding-system company; computer match paint colors to the color chips.
B. Mockups: Prepare mockups of maintenance repainting processes for each type of coating system and substrate indicated and each color and finish required to demonstrate aesthetic effects and to set quality standards for materials and execution. Duplicate appearance of approved Sample submittals.
   1. Locate mockups on existing surfaces where directed by Architect and in locations that enable viewing under same conditions as the completed Work.
2. Surface-Preparation Mockups: On existing surfaces using applicable specified methods of cleaning and other surface preparation, provide mockup sample of at least 25 square feet.
3. Coating Mockups: Two surfaces of at least 25 square feet to represent surfaces and conditions for application of each type of coating system under same conditions as the completed Work.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing of cleaning materials, paint removers and compatibility of paint coatings and systems for each indicated type of painted surface.
   1. Use test areas as indicated and representative of proposed materials and existing construction.
   2. Propose changes to materials and methods to suit Project.

1.11 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 degrees F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste daily.

1.12 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 degrees F.
C. Do not apply paint in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
   1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer for surface preparation and during paint application and drying periods.

PART 2 - PRODUCTS

2.1 PREPARATORY CLEANING MATERIALS

A. Water: Potable.
B. Hot Water: Water heated to a temperature of 140 to 160 degrees F.
C. Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for every 5 gallons of solution required.
D. Mildewcide: Commercial proprietary mildewcide or a job-mixed solution prepared by mixing 1/3 cup of household detergent that contains no ammonia, 1 quart of 5 percent sodium hypochlorite bleach, and 3 quarts of warm water.

E. Abrasives for Ferrous Metal Cleaning: Aluminum oxide paper, emery paper, fine steel wool, steel scrapers, and steel-wire brushes of various sizes.

F. Rust Remover: Manufacturer's standard phosphoric acid-based gel formulation, also called "naval jelly," for removing corrosion from iron and steel.

2.2 PAINT REMOVERS

A. Low-Odor, Solvent-Type Paste Paint Remover: Manufacturer's standard low-odor, water-rinsable, solvent-type paste, gel, or foamed emulsion formulation for removing paint from masonry, stone, wood, plaster, or metal as required to suit Project; and containing no methanol or methylene chloride.
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. ABR Products, Inc.; Super Bio Strip Gel.
   b. Cathedral Stone Products, Inc.; S-301.
   c. Dumond Chemicals, Inc.; Smart Strip Pro.
   d. PROSOCO, Inc.; Enviro Klean SafStrip.

2.3 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: Refer to the Drawings and finishes schedules Refer to finish schedule.

2.4 PAINT MATERIALS, GENERAL

A. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base:
1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
5. Pretreatment Wash Primers: 420 g/L.
6. Floor Coatings: 100 g/L.
7. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.
10. Stains: 250 g/L.

B. Transition Coat: Paint manufacturer's recommended coating for use where a residual existing coating is incompatible with the paint system.
2.5 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.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   b. ConServ Epoxy LLC; Flexible Epoxy Consolidant 100 with Flexible Epoxy Patch 200.
   d. System Three Resins, Inc.; Sculpwood.

B. Metal-Patching Compound: Two-part, polyester-resin, metal-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of metal repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated from corrosion. Filler shall be capable of filling deep holes and spreading to feather edge.

C. Gypsum-Plaster Patching Compound: Finish coat plaster and bonding compound according to ASTM C 842 and manufacturer's written instructions.

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 5 feet away from painted surface and from building exterior at 20 feet 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.
   5. Portland Cement Plaster: 12 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.

E. Chemical Rust Removal:
1. Remove loose rust scale with specified abrasives for ferrous-metal cleaning.
2. Apply rust remover with brushes or as recommended in writing by manufacturer.
3. Allow rust remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing. Do not allow extended dwell time.
4. Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended in writing by manufacturer to remove residue.
5. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
6. Prime immediately with clean, soft cloths. Follow direction of grain in metal. Do not touch cleaned metal surface until primed.

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. Metal Substrates: If using wire brushes on metal, use brushes of same metal composition as metal being treated.
   b. 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 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 degrees F 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 Solvent-Type Paste Paint Remover:
1. Remove loose and peeling paint using water, 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. Rinse with cold or hot water applied by low or medium-pressure spray to remove chemicals and paint residue.
5. Use mechanical methods recommended in writing by manufacturer to remove chemicals and paint residue.
6. Repeat process if necessary to remove all paint.

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 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. Gypsum-Plaster and Gypsum-Board Substrates:
1. Repair defects including dents and chips more than 1/8 inch 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.

D. Metal Substrate:
1. Preparation: Treat repair locations by wire-brushing and solvent cleaning. Use chemical or mechanical rust removal method to clean off rust.
2. Defects in Metal Surfaces: Repair non-load-bearing defects in existing metal surfaces, including dents and gouges more than 1/16 inch deep or 1/2 inch across and all holes and cracks by filling with metal-patching compound and sanding smooth. Remove burrs and protruding fasteners.
3. Priming: Prime iron and steel surfaces immediately after repair to prevent flash rusting. Stripe paint corners, crevices, bolts, welds, and sharp edges. Apply two coats to surfaces that are inaccessible after completion of the Work.

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. Metal Substrate: Stripe paint corners, crevices, bolts, welds, and sharp edges before applying full coat. Apply two coats to surfaces that are inaccessible after completion of the Work. Tint stripe coat different than the main coating and apply with brush.

E. 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.

B. Paint Material Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for composition and dry film thickness.
   1. Paint Composition: The following procedure may be performed at any time and as often as Owner deems necessary during the period when paints are being applied:
      a. Testing agency will sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
      b. Testing agency will perform tests for compliance of paint materials with product requirements.
      c. If test results show materials being used do not comply with product requirements, Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.
   2. Dry Film Thickness:
      a. Contractor shall touch up and restore painted surfaces damaged by testing.
      b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

### 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 SURFACE-PREPARATION SCHEDULE

A. General: Before painting, prepare surfaces for painting according to applicable requirements specified in this schedule.
   1. Examine surfaces to evaluate each surface condition according to paragraphs below.
2. Where existing degree of soiling prevents examination, preclean surface and allow it to dry before making an evaluation.

3. Repair substrate defects according to "Substrate Repair" Article.

B. Surface Preparation for no visible Degree of Surface Degradation:
   1. Surface Condition: Existing paint film in good condition and tightly adhered.
   2. Paint Removal: Not required.
   3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Roughen or degloss cleaned surfaces to ensure paint adhesion according to paint manufacturer's written instructions.

C. Surface Preparation for minor, localized Degree of Surface Degradation:
   1. Surface Condition: Paint film cracked or broken but adhered.
   2. Paint Removal: Scrape by hand-tool cleaning methods to remove loose paint until only tightly adhered paint remains.
   3. Preparation for Painting: Wash surface by detergent cleaning; use other cleaning methods for small areas of bare substrate if required. Roughen, degloss, and sand the cleaned surfaces to ensure paint adhesion and a smooth finish according to paint manufacturer's written instructions.

D. Surface Preparation for minor, comprehensive Degree of Surface Degradation:
   1. Surface Condition: Paint film loose, flaking, or peeling.
   2. Paint Removal: Remove loose, flaking, or peeling paint film by hand-tool or chemical paint-removal methods.
   3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Use other cleaning methods for small areas of bare substrate if required. Sand surfaces to smooth remaining paint film edges. Prepare bare cleaned surface to be painted according to paint manufacturer's written instructions for substrate construction materials.

E. Surface Preparation for more severe Degree of Surface Degradation:
   1. Surface Condition: Paint film severely deteriorated and surface indicated to have paint completely removed.
   3. Preparation for Painting: Prepare bare cleaned surface according to paint manufacturer's written instructions for substrate construction materials.

F. Surface Preparation for surfaces requiring substrate repairs prior to re-finishing:
   1. Surface Condition: Missing material, small holes and openings, and deteriorated or corroded substrate.
   2. Substrate Preparation: Repair, replace, and restore substrate conditions as required. Refer to Gypsum Board specification.
   3. Preparation for Painting: Sand substrate surfaces to smooth remaining paint film edges and prepare according to paint manufacturer's written instructions for substrate construction materials. Remove rust.
   4. Painting: Paint as required to match to adjacent surfaces for degree of surface degradation.

3.11 INTERIOR MAINTENANCE REPAINTING SCHEDULE

A. Existing Ferrous Metal Substrates (Steel and Iron Railings): Refer to "09 91 23 Interior Painting" for required paint system.

B. Existing Wood Doors, Frames, Moldings, Trims and Bases: Refer to "09 91 23 Interior Painting" for required paint systems.
C. Existing Gypsum Board and Plaster Substrates: Refer to "09 91 23 Interior Painting" for required paint system.
D. Existing Exterior Wood Door and Frame Substrates: Refer to "09 91 13 Exterior Painting" for required paint system.

END OF SECTION
SECTION 09 03 20 - HISTORIC TREATMENT OF PLASTER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Repair[ and replacement] of historic [interior] [and] [exterior] lime plaster.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 35 91 "Historic Treatment Procedures" for general historic treatment requirements.
   3. Section 06 10 00 "Rough Carpentry" for wood framing, grounds, and furring that support lath and plaster.
   4. Section 09 03 91 "Historic Treatment of Plain Painting" for paint removal, surface preparation for refinishing, and refinishing of historic plaster surfaces.
   5. Section 09 24 00 "Cement Plastering" for products to use for exterior cement plaster restoration.

1.2 ALLOWANCES

A. Allowances for historic treatment of plaster are specified in Section 01 21 00 "Allowances."
   1. Perform historic treatment of plaster under quantity allowances and only as authorized. Authorized work includes work required by Drawings and Specifications and work as directed in writing by Architect.
   2. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.
   3. Perform work that exceeds quantity allowances only as authorized by Change Orders.

B. Historic plaster repair and replacement is part of historic plaster repair allowance unless otherwise indicated.

C. Repair or replace damaged exterior cementitious plasterwork at chimneys, parapet copings, roof intermediate parapets and other locations are directed by the Architect and Owner.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to historic treatment of plaster including, but not limited to, the following:
      a. Verify historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, colors, patterns, and sequencing.
      c. Fire-protection plan.
      d. Plasterwork historic treatment program.
      e. Coordination with building occupants.
1.4 SEQUENCING AND SCHEDULING

A. Perform historic treatment of plaster in the following sequence, which includes work specified in this and other Sections:
   1. Dismantle existing surface-mounted objects and hardware that overlie plaster surfaces 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 plaster surfaces.
   4. Clean plaster surface and remove paint and other finishes to the extent required.
   5. Repair and replace existing plaster and supports to the degree required for a uniform, tightly adhered surface on which to paint or apply other finishes.
   6. Cure repaired surfaces and allow them to dry for proper finishing.
   7. Paint and apply other finishes.
   8. Reinstall dismantled surface-mounted objects and hardware unless otherwise indicated.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include recommendations for product application and use.

B. Shop Drawings: For each configuration required for the work.
   1. Include plans, elevations, and sections that show locations and extent of work.
   2. Show full-size details of configurations, joint locations, and attachments to other work.

C. Samples for Initial Selection: For each exposed product that will be exposed and not be painted or otherwise finished and for each color and texture specified.

D. Samples for Verification: For the following products:
      a. Patterns for Casting: Before manufacturing cast-plaster fabrications, submit the actual patterns from which molds will be made for casting new units. Package and ship to prevent loss or damage or make patterns available for inspection by Architect at fabrication plant.
   2. Linear Moldings: 24-inch-long section of each configuration wet-applied molding with finished joint. Show complete pattern and applied nonlinear cast-plaster shapes, if any.
   3. Nonlinear Shapes: Full-size unit of each configuration.
   5. Accessories: Each type in manufacturer's standard size.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified historic treatment specialist.

B. Plasterwork Historic Treatment Program: Submit before work begins.

1.7 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic plastering specialist with expertise in matching and performing the types of historic plasterwork repairs required. Experience only in installing and repairing new plasterwork, veneer plaster, or gypsum board is insufficient experience for historic treatment work.
Mockups: Prepare mockups of historic treatment processes for each type of plaster repair and reconstruction work to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.

1. Locate mockups on existing surfaces where directed by Architect in locations that enable viewing under same conditions as the completed Work.
2. Number and Size: Two vertical surfaces of at least [25 sq. ft.] or approximately 48 inches in least dimension to represent surfaces and conditions for application of each type of plaster repair and reconstruction under same conditions as the completed Work. Include at least the following:
   a. Install 6 linear ft. of wet-applied plaster cornice molding.
   b. Repair 3 linear ft. of plaster cracks.
   c. Reattach 4-sq. ft. area of delaminated / spawled plaster that has fallen.
3. Simulate finished lighting conditions for review of mockups.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
B. Store materials on elevated platforms, under cover, and in a dry location with ambient temperatures continuously maintained at not less than 45 deg F.
C. Store hydrated lime and factory-prepared lime putty in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
D. Store materials not in use in tightly covered containers.
E. Store lime putty covered with water in sealed containers.
F. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.9 FIELD CONDITIONS

A. Comply with plaster-material manufacturers' written instructions.
B. Temperatures: Maintain temperatures in work areas at not less than 55 degrees F or greater than 80 degrees F for at least seven days before application of plaster, continuously during application, and for seven days after plaster has set or until plaster has dried.
C. Conditioning: Acclimatize cast-plaster fabrications to ambient temperature and humidity of spaces in which they are installed. Remove packaging and move units into installation spaces not less than 48 hours before installing them.
D. Field Measurements: Where plaster fabrications 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.
E. Avoid conditions that result in plaster drying out too quickly.
   1. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
   2. Maintain relative humidity levels for prevailing ambient temperature that produce normal drying conditions.
   3. Ventilate work areas in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.
PART 2 - PRODUCTS

2.1 LIME-PLASTER MATERIALS

A. Hydrated Lime: ASTM C 206, Type N.
B. Sand Aggregates: ASTM C 897.
   1. Finish-Coat Sand: Match size, texture, and gradation of existing sand as closely as possible. Blend several sands if necessary to achieve suitable match.

2.2 LATH

A. Metal Lath:
      a. Diamond-Mesh Lath: Self-furring, 2.5 lb/sq. yd. 3.4 lb/sq. yd..

2.3 TRIM ACCESSORIES

A. General: According to ASTM C 1063 for lime plaster; coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
B. Metal Accessories:
      a. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
      b. Small nose cornerbead with perforated flanges; use on curved corners.
      c. Small nose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
      d. Bull nose cornerbead, radius of 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.
   4. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
   5. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
   6. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.

2.4 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
B. Fasteners for Attaching Lath to Substrates:
   1. For Lime Plaster: ASTM C 1063.
C. Wire Ties: ASTM A 641/A 641M, Class I zinc coating, soft temper, not less than 0.0475-inch diameter, unless otherwise indicated.
D. Plaster-Stabilization Materials: Acrylic emulsion(s) and related installation products shall have proven effectiveness in reattaching delaminated plaster and shall have been used previously by historic treatment specialist with successful results.
   1. Acrylic Emulsion(s), General: Aqueous emulsion(s) of acrylic polymer, adhesive to plaster and plaster substrates, nontoxic, and non-reemulsifiable after curing.
   2. Prewet Solution: Low-viscosity acrylic emulsion.
   3. Adhesive: Thickened acrylic emulsion; thickener as recommended in writing by resin manufacturer and historic treatment specialist.

E. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:
   1. Previous effectiveness in performing the work involved.
   2. Little possibility of damaging exposed surfaces.
   3. Consistency of each application.
   4. Uniformity of the resulting overall appearance.
   5. Do not use products or tools that could do the following:
      a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
      b. Leave an unintended residue on surfaces.

PART 3 - EXECUTION

3.1 HISTORIC TREATMENT SPECIALIST

   A. Historic Treatment Specialist Firms: Subject to compliance with requirements, [provide historic treatment of plaster by one of the following] [firm performing the work much be a recognized historic treatment specialist with a minimum 5 years prior experience. Qualifications validating experience level will be required to be submitted. provide historic treatment of plaster include, but are not limited to, the following]:

3.2 HISTORIC TREATMENT OF PLASTER, GENERAL

   A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from building interior at 5 feet away from surface and from building exterior at 20 feet away from surface.
   B. General: In treating historic plaster, disturb it as minimally as possible and as follows unless otherwise indicated:
      1. Dismantle loose, damaged, or deteriorated plaster, lath, and support systems that cannot be repaired.
      2. Verify extent of plaster deterioration against that indicated on Drawings. Consult Architect on types and extent of required work.
      3. Verify that substrate surface conditions are suitable for repairs.
      4. Provide lath, furring, and support systems for plaster included in the work of this Section.
      5. Replace lost details in new, wet-applied and cast plaster that replicate existing or indicated plaster configurations.
      6. Leave repaired plasterwork in proper condition for painting or applying other finishes as indicated.
      7. Install temporary protective measures to protect historic surfaces that shall be treated later.
C. Illumination: Perform plastering work with adequate, uniform illumination that does not distort the flatness or curvature of surfaces.

3.3 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate and environmental conditions, installation tolerances, and other conditions affecting performance of the Work.
   1. If existing substrates cannot be prepared to an acceptable condition for plastering work, notify Architect in writing.
   2. Notify Architect of undocumented detrimental conditions including cracks, bulges, loose backup, rotted wood, rusted metal, and other deteriorated items.
C. Begin historic plastering work only after unsatisfactory conditions have been corrected.

3.4 PREPARATION FOR PLASTERING

A. Substrates: Prepare according to plaster manufacturer's written instructions and as follows:
   1. Clean surfaces to remove dust, loose particles, grease, oil, incompatible curing compounds, form-release agents, and other foreign matter and deposits that could impair bond with plaster.
   2. Remove ridges and protrusions greater than 1/8 inch and fill depressions greater than 1/4 inch with patching material. Allow to set and dry.

3.5 PLASTER REMOVAL AND REPLACEMENT, GENERAL

A. Dismantle plaster that is damaged or deteriorated to the limits indicated. Carefully dismantle areas along straight edges that lie over supports, without damaging surrounding plasterwork.
B. Maintain lath and supporting members in an undamaged condition so far as practicable. Dismantle damaged lath and supports that cannot be repaired or resecured and replace with new work of same type.
C. Notify Architect of undocumented detrimental conditions including cracks, bulges, loose backup, rotted wood, rusted metal, and other deteriorated items.
D. Do not deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
E. Clean substrate surfaces to remove grease, waxes, oils, waterborne staining, debris, and other foreign matter and deposits that could impair bond with repair material.
F. Wet bases before plaster application. Keep substrate damp to the touch but without visible water droplets.
G. Wet remaining plaster abutting the replacement plaster before installing new plasterwork.
H. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
I. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
3.6 FLAT LIME-PLASTER REMOVAL AND REPLACEMENT

A. General: Dismantle deteriorated plaster to existing sound plaster [at locations indicated on Drawings].
   1. Inspect for lath deterioration. If any, replace lath.
   2. Sand bonding surfaces of repair area, and clean the surface with a nonmetallic bristle brush.
   3. Wet substrate to damp condition, but without visible water droplets, then install new plaster to original profiles.

B. Lime-Plaster Base Coats:
   1. Scratch Coat: [1 part lime putty, 2-1/2 parts base-coat sand] [1 part lime putty, 2-1/2 parts base-coat sand, and fiber] <Insert mix>.[ Add hair fiber to mix and evenly distribute it without clumps just before spreading.]
   2. Brown Coat: [1 part lime putty, 3 parts base-coat sand] <Insert mix>.

C. Lime-Plaster Finish Coats:
   1. Finish-Coat Mix for Sandy Float Finish: As required to match existing adjacent surface finish.

D. Lime-Plaster Finishes:
   1. Provide sandy-float finish unless otherwise indicated. Apply in two layers totaling 1/8 inch thick.

E. Hairline cracking within the plaster or plaster separation at edge of a replacement is unacceptable. Completely dismantle such work and reinstall or repair as a crack repair.

3.7 REMOVING AND INSTALLING LATH AND ACCESSORIES

A. General: Dismantle existing plaster as necessary to expose deteriorated or rusted lath, wire ties, and support system, back to firm substrates and supports. Repair with new materials, well secured to existing lath in good condition and to building structure.
   1. Cutting: Cut lath so it can be taken out completely from one support to the next. Cut to avoid cracking surrounding plaster.
   2. Cut out existing base-coat plaster beyond the edges of the new lath to permit new plaster to extend onto the old lath. Then step subsequent plaster coats to permit new plaster to extend over the old material.
   3. Fasten new lath to support system and to good existing lath. Wire tie at least every 6 inches.
   4. Install new lath according to ASTM C 1063 for lime plaster.

B. Notify Architect of undocumented detrimental conditions including cracks, bulges, loose backup, rotted wood, rusted metal, and other deteriorated items.

C. Metal Lath: Install according to ASTM C 1063 for lime plaster.
   2. Flat-Ceiling and Horizontal Framing: Install lath.

3.8 PATCH-TYPE REPAIR

A. General: Patch voids, fractured surfaces, and crushed areas in otherwise sound plaster that are larger than cracks.
   1. Notify Architect of undocumented detrimental conditions including cracks, bulges, loose backup, rotted wood, rusted metal, and other deteriorated items.
   2. Inspect for deterioration of supporting plaster and lath, and repair or replace deteriorated material as required for a sound substrate.
3. Rake perimeter of hole to sound plaster, and slightly undercut existing plaster to enable replacement plaster to tuck behind existing plaster.
4. Replace missing lath in kind. Bridge gaps in wood lath with expanded-metal lath, overlapping wood by 6 inches and fastening them together.
5. Clean hole to remove loose materials and other foreign matter and deposits that could impair bond with repair material. Where grease, waxes, oils, waterborne staining, or other foreign matter and deposits that could impair bond with repair material have penetrated into the plaster, enlarge the hole to remove these deposits.
6. Wet substrate to damp condition, but without visible water droplets, then install patch material to original profiles.
7. Maintain adjacent plasterwork in an undamaged condition so far as practicable.

B. Lime-Plaster Mix: [3 parts lime putty, 1 part gypsum neat plaster or gypsum gaging plaster] [1 part lime putty, 3 parts sand] [1 part lime putty, 2-1/2 parts sand, applied in two coats with fiber in first coat] [Repair mix demonstrated in mockup] <Insert proportions>. [Add hair fiber to mix and evenly distribute it without clumps just before spreading.]

C. Finishing: Finish flat surfaces flush and with same texture as adjacent existing plaster. For molded plaster shapes, tool surface to restore the sharp edges and the shape of the molded shape to original contours.

D. Hairline cracking within the plaster or plaster separation at edge of a patch is unacceptable. Completely dismantle such work and reinstall or repair.

3.9 HAIRLINE CRACK REPAIR

A. General: Repair cracks 1/32 inch in width or narrower in otherwise sound plaster.
   1. Notify Architect of undocumented detrimental conditions including cracks, bulges, loose backup, rotted wood, rusted metal, and other deteriorated items.
   2. Maintain adjacent plasterwork in an undamaged condition so far as practicable.
B. Existing Topcoat: Open crack in existing topcoat to at least 1/8 inch in width and check for broken fiber reinforcement in base coats.
C. Existing Base Coats: Do not open crack wider in existing base coats unless inspection or other indication shows that the fiber reinforcement has broken. Where inspections indicate failure of fiber reinforcement, proceed as for a large crack repair, but only for length of crack with broken fiber reinforcement.
D. Clean out crack to remove loose materials and other foreign matter and deposits that could impair bond with repair material. Where grease, waxes, oils, waterborne staining, or other foreign matter and deposits that could impair bond with repair material have penetrated into the topcoat plaster, widen the crack and sand surface of the exposed basecoat to remove these deposits.
E. Wet substrate to damp condition, but without visible water droplets.
F. Force Insert requirement into crack, filling crack to original plaster profile.

3.10 LARGE CRACK REPAIR

A. General: Repair cracks over 1/32 inch in width in otherwise sound plaster.
   1. Notify Architect of undocumented detrimental conditions including cracks, bulges, loose backup, rotted wood, rusted metal, and other deteriorated items.
   2. Maintain adjacent plasterwork in an undamaged condition so far as practicable.
B. Open crack to at least 1/8 inch in width and full depth with V-groove tool, and check for bond separation or lath deterioration.
C. Abrade side surfaces of crack and remove inner crack debris by gouging (keying) the inside area of the crack.
Clean out crack to remove loose materials and other foreign matter and deposits that could impair bond with repair material. Where grease, waxes, oils, waterborne staining, or other foreign matter and deposits that could impair bond with repair material have penetrated into the plaster, widen the crack to remove these deposits.

Wet substrate to damp condition, but without visible water droplets.

Install finish-coat plaster to fill crack to original plaster profile.

Finishing: Finish flat surfaces flush and with same texture as adjacent existing plaster. For molded plaster shapes, tool surface to restore the sharp edges and the shape of the molded shape to original contours.

Offset Cracks: If the crack is offset in surface plane by more than 1/8 inch, dismantle the plaster on each side of the crack, a minimum width of 6 inches and down to the lath or other substrate. Then, repair as specified for flat-plaster removal and replacement.

3.11 INSTALLATION TOLERANCES

Completed plaster installation shall not deviate from a true plane by more than 1/8 inch as measured by a 5-foot straightedge placed at any location on a surface, except where existing plaster is retained as a substrate for new plasterwork.

3.12 CLEANING AND PROTECTION

Protect work of other trades against damage. Promptly remove plaster from surfaces not indicated to be repaired or plastered. Do not scratch or damage finished surfaces.

Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

Correct damage to other historic surfaces and to new work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

Remove temporary protection and enclosure of other work.

END OF SECTION
SECTION 09 03 91 - HISTORIC TREATMENT OF PLAIN PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment of plain painting as follows:
   1. Removing existing paint.
   2. Repairing substrates.
   3. Plain painting of historic surfaces, including staining and varnishing of historic wood.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 35 91 "Historic Treatment Procedures" for general historic treatment requirements.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.
H. Historic Paint Materials: Paint materials manufactured to match historic paint formulations; either custom-formulated products or standard products of manufacturers of historic paint materials.
I. Modern Paint Materials: Paint materials not designed to match historic paint formulations but that may be required to match historic paint colors.
J. Plain Painting: For historic treatment, this means painting that requires attention to historic treatment requirements, but no special, decorative or artistic painting skill.
K. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
L. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of painting.
   2. Review methods and procedures related to historic treatment of painting including, but not limited to, the following:
      a. Verify historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Materials, material application, colors, patterns, and sequencing.
      c. Fire-protection plan.
d. Plain painting historic treatment program.

e. Coordination with building occupants.

1.4 SEQUENCING AND SCHEDULING

A. Perform historic treatment of painting 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.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include recommendations for product application and use. 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 long in least dimension, but not less than whole pattern.
   1. For each painted color being matched to a standardized color-coding system, include the color chips from the color-coding-system company with Samples.
   2. Include a list of materials for each coat of each Sample.
   3. Label each Sample for location and application.
   4. Sample Size:
      a. Plain Painted Surfaces: 4-by-8-inch Samples for each color and material, on hardboard.
      b. Stained or Natural Wood: 12-by-12-inch Samples of natural- or stained-wood finish, on representative surfaces.

C. Product List: For each paint product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Printout of current MPI's "MPI Approved Products List" for each MPI-product category specified in paint systems, with the proposed product highlighted.
   3. VOC content.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For historic treatment specialist(s) paint-remover manufacturer.
B. Color Matching Certificate: For computer color matching of historic colors.
1.7 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 gallon of each material and color applied.

1.8 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic painting specialist with expertise in matching and touching up existing painting. Experience only in new painting work is insufficient experience for historic treatment work.

B. Paint-Remover Manufacturer Qualifications: A firm regularly engaged in producing paint removers that have been used for similar historic painting applications with successful results, and with factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.

C. Color Matching: Custom computer-match paint colors to colors indicated in historic painting schedule(s) at the end of Part 3. For colors indicated by a standardized coding system, obtain a color chip for each color indicated from the color-coding-system company; computer match paint colors to the color chips.

D. Plain Painting Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site and control of runoff during cleaning, paint removal, repainting, and other processes.
   1. If materials and methods other than those indicated are proposed for any phase of historic treatment 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.

E. Mockups: Prepare mockups of historic treatment processes for each type of coating system and substrate indicated and each color and finish required to demonstrate aesthetic effects and to set quality standards for materials and execution. Duplicate appearance of approved Sample submittals.
   1. Locate mockups on existing surfaces where directed by Architect.
   2. Surface-Preparation Mockups: On existing surfaces using applicable specified methods of cleaning and other surface preparation, provide mockup sample of at least 100 sq. ft.
   3. Coating Mockups: One wall surfaces of at least 50 sq. ft. to represent surfaces and conditions for application of each type of coating system under same conditions as the completed Work.
      a. Plain painted surfaces.
      b. Stained or natural wood.
   4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
1.9 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste daily.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with historic treatment of painting 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 degrees F.
C. Do not apply paint in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
   1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer for surface preparation and during paint application and drying periods.
D. Concealed and undocumented historic items, murals, and similar objects encountered during historic treatment remain Owner's property. Carefully protect each item or object.
   1. Coordinate with Owner's historical adviser, who will establish special procedures for protection.

PART 2 - PRODUCTS

2.1 PREPARATORY CLEANING MATERIALS

A. Water: Potable.
B. Hot Water: Water heated to a temperature of 140 to 160 degrees F.
C. Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for every 5 gallon of solution required.
D. Mildewcide: Commercial proprietary mildewcide or a job-mixed solution prepared by mixing 1/3 cup of household detergent that contains no ammonia, 1 quart of 5 percent sodium hypochlorite bleach, and 3 quarts of warm water.
E. Abrasives for Ferrous Metal Cleaning: Aluminum oxide paper, emery paper, fine steel wool, steel scrapers, and steel-wire brushes of various sizes.
F. Rust Remover: Manufacturer's standard phosphoric acid-based gel formulation, also called "naval jelly," for removing corrosion from iron and steel.

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

2.3 MODERN 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 MODERN PAINT MATERIAL MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   2. Benjamin Moore.

2.5 MODERN PAINT MATERIALS

A. Primers and Sealers:
   1. Primer Sealer, Latex, Interior: [MPI #50.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
   2. Primer, Latex, for Interior Wood: [MPI #39.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
   3. Primer Sealer, Alkyd, Interior: [MPI #45.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
   4. Alkyd, Sanding Sealer, Clear: [MPI #102.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
   5. Shellac: [MPI #88.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
   6. Stain, Semi-Transparent, for Interior Wood: [MPI #90.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

B. Metal Primers:
   1. Primer, Metal, Surface Tolerant: [MPI #23.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
   2. Primer, Alkyd, Anti-Corrosive for Metal: [MPI #79.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

C. Wood Primers:
   1. Primer, Latex for Exterior Wood: [MPI #6.]
      a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
D. Water-Based Paints:
1. Latex, Interior, Flat, (Gloss Level 1): [MPI #53.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
2. Latex, Interior, (Gloss Level 2): [MPI #44.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
3. Latex, Interior, (Gloss Level 3): [MPI #52.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
4. Latex, Interior, (Gloss Level 4): [MPI #43.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.
5. Latex, Interior, Semigloss, (Gloss Level 5): [MPI #54.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

E. Solvent-Based Paints:
1. Alkyd, Exterior, Semigloss (Gloss Level 5): [MPI #94.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

F. Solvent-Based Varnishes:
1. Varnish, Interior, Semigloss (Gloss Level 5): [MPI #74.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

G. Polyurethane Coatings:
1. Polyurethane, Two-Component, Pigmented, Gloss (Gloss Level 6): [MPI #72.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

H. Polyurethane Varnishes:
1. Varnish, Interior, Polyurethane, Oil-Modified, Gloss (Gloss Level 6): [MPI #56.]
   a. [Basis-of-Design Product:] <Insert manufacturer's name; product name or designation>.

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 due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

B. Metal Patching Compound: Two-part, polyester-resin, metal patching compound; knife-grade formulation as recommended in writing by manufacturer for type of metal repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated due to corrosion. Filler shall be capable of filling deep holes and spreading to feather edge.

C. 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 HISTORIC TREATMENT SPECIALIST

A. Historic Treatment Specialist Firms: Subject to compliance with requirements, [provide historic treatment of plain painting by one of the following] [firms that may provide historic treatment of plain painting include, but are not limited to, the following]:
   1. >Insert, in separate subparagraphs, names of historic treatment specialist firms>.

3.2 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.

3.3 HISTORIC TREATMENT OF PAINTING, GENERAL

A. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from building interior at [5 feet] [10 feet] >Insert distance< away from painted surface and from building exterior at [20 feet] [50 feet] >Insert distance< away from painted surface.

B. Execution of the Work: In treating historic items, 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 painting.
   3. Allow other trades to repair items in place and retain as much original material as possible before repainting.
   4. Reproduce original, historic paint systems where indicated or scheduled.
   5. Install temporary protective measures to protect historic painted surfaces that shall be treated later.

C. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and lightly hand sanding, that will not abrade softer substrates, reducing clarity of detail. Do not use abrasive methods such as rotary sanding, rotary wire brushing, or power tools except as indicated as part of the historic treatment program and as approved by Architect.

D. Heat Processes: Do not use torches, heat guns, or heat plates.
3.4 EXAMINATION

A. Examine substrates and conditions, with historic treatment specialist 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] <Insert number> percent.
2. Gypsum Board: [12] <Insert number> percent.
7. <Insert surface to be repainted>: <Insert number> 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.

3.5 PREPARATORY CLEANING

A. General: Use only 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.

E. Chemical Rust Removal:

1. Remove loose rust scale with approved abrasives for ferrous-metal cleaning.
2. Apply rust remover with brushes or as recommended in writing by manufacturer.
3. Allow rust remover to remain on surface for period recommended in writing by manufacturer or as determined by preconstruction testing. Do not allow extended dwell time.
4. Wipe off residue with mineral spirits and either steel wool or soft rags, or clean with method recommended in writing by manufacturer to remove residue.
5. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
6. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

F. Mechanical Rust Removal:
1. Remove rust with approved abrasives for ferrous-metal cleaning. Clean to bright metal.
2. Wipe off residue with mineral spirits and either steel wool or soft rags.
3. Dry immediately with clean, soft cloths. Follow direction of grain in metal.
4. Prime immediately to prevent rust. Do not touch cleaned metal surface until primed.

3.6 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 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. Metal Substrates: If using wire brushes on metal, use brushes of same metal composition as metal being treated.
   b. 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 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 degrees F 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. Do not use other methods except as indicated as part of the historic treatment program and as approved by Architect.
3.7 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] [1/4 inch] <Insert dimension> 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] [1/2 inch] <Insert dimension> 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. Metal Substrate:
   1. Preparation: Treat repair locations by wire-brushing and solvent cleaning. Use [chemical] [or] [mechanical] rust removal method to clean off rust.
   2. Defects in Metal Surfaces: Repair non-load-bearing defects in existing metal surfaces, including dents and gouges more than [1/16 inch] [1/8 inch] <Insert dimension> deep or [1/2 inch] [1 inch] <Insert dimension> across and all holes and cracks by filling with metal patching compound and sanding smooth. Remove burrs and protruding fasteners.
   3. Priming: Prime iron and steel surfaces immediately after repair to prevent flash rusting. Stripe paint corners, crevices, bolts, welds, and sharp edges. Apply two coats to surfaces that are inaccessible after completion of the Work.

3.8 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. Metal Substrate: Stripe paint corners, crevices, bolts, welds, and sharp edges before applying full coat. Apply two coats to surfaces that are inaccessible after completion of the Work. Tint stripe coat different than the main coating and apply with brush.

E. Blending Plain 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.
3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a testing agency to perform tests and inspections. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.

B. Notify testing agency in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until testing agency has had reasonable opportunity to inspect work areas at lift device or scaffold location.

C. Manufacturer's Field Service: Engage paint-remover manufacturer's factory-authorized service representative for consultation and Project-site inspection, and provide on-site assistance when requested by Architect.

D. Paint Material Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for composition and dry film thickness.
   1. Paint Composition: The following procedure may be performed at any time and as often as Owner deems necessary during the period when paints are being applied:
      a. Testing agency will sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
      b. Testing agency will perform tests for compliance of paint materials with product requirements.
      c. If test results show materials being used do not comply with product requirements, Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.
   2. Dry Film Thickness:
      a. Contractor shall touch up and restore painted surfaces damaged by testing.
      b. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

3.10 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.

3.11 SURFACE-PREPARATION SCHEDULE

A. General: Before painting, prepare surfaces [where indicated on Drawings] for painting according to applicable requirements specified in this schedule.
   1. Examine surfaces to evaluate each surface condition according to paragraphs below.
   2. Where existing degree of soiling prevents examination, preclean surface and allow it to dry before making an evaluation.
   3. Repair substrate defects according to "Substrate Repair" Article.
B. Surface Preparation for [MPI DSD 0] >Insert designation< Degree of Surface Degradation:
   1. Surface Condition: Existing paint film in good condition and tightly adhered.
   2. Paint Removal: Not required.
   3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Roughen or degloss cleaned surfaces to ensure paint adhesion according to paint manufacturer's written instructions.

C. Surface Preparation for [MPI DSD 1] >Insert designation< Degree of Surface Degradation:
   1. Surface Condition: Paint film cracked or broken but adhered.
   2. Paint Removal: Scrape by hand-tool cleaning methods to remove loose paint until only tightly adhered paint remains.
   3. Preparation for Painting: Wash surface by detergent cleaning; use other cleaning methods for small areas of bare substrate if required. Roughen, degloss, and sand the cleaned surfaces to ensure paint adhesion and a smooth finish according to paint manufacturer's written instructions.

D. Surface Preparation for [MPI DSD 2] >Insert designation< Degree of Surface Degradation:
   1. Surface Condition: Paint film loose, flaking, or peeling.
   2. Paint Removal: Remove loose, flaking, or peeling paint film by hand-tool or chemical paint-removal methods.
   3. Preparation for Painting: Wash surface by detergent cleaning; use solvent cleaning where needed. Use other cleaning methods for small areas of bare substrate if required. Sand surfaces to smooth remaining paint film edges. Prepare bare cleaned surface to be painted according to paint manufacturer's written instructions for substrate construction materials.

E. Surface Preparation for [MPI DSD 3] >Insert designation< Degree of Surface Degradation:
   1. Surface Condition: Paint film [severely deteriorated] [obscuring fine architectural detail work because of paint-layer buildup] [and] [surface indicated to have paint completely removed].
   3. Preparation for Painting: Prepare bare cleaned surface according to paint manufacturer's written instructions for substrate construction materials.

F. Surface Preparation for [MPI DSD 4] >Insert designation< Degree of Surface Degradation:
   1. Surface Condition: Missing material, small holes and openings, and deteriorated or corroded substrate.
   2. Substrate Preparation: Repair, replace, and treat substrate according to "Substrate Repair" Article[ and requirements in other Specification Sections].
   3. Preparation for Painting: Sand substrate surfaces to smooth remaining paint film edges and prepare according to paint manufacturer's written instructions for substrate construction materials. Remove rust.

3.12 EXTERIOR HISTORIC PAINTING SCHEDULE

A. Wood [Porch Ceiling] <Insert item description or drawing designation, or both>:
   1. Historic system[ over a transition coat].

c. Topcoat: .

d. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

B. Ferrous Metal Substrates: [Cast-iron facade and storefront] [Wrought-iron railing and gate] <Insert item description or drawing designation, or both>:

1. Alkyd System: [MPI REX 5.1D] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Metal, Surface Tolerant[, MPI #23].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Metal, Surface Tolerant[, MPI #23].
   d. Intermediate Coat: [Alkyd, exterior, matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Alkyd, exterior, semigloss (Gloss Level 5)[, MPI #94].
   f. Topcoat: Alkyd, exterior, gloss (Gloss Level 6)[, MPI #9].
   g. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

2. High-Performance, Pigmented-Polyurethane-over-Epoxy System: [MPI REX 5.1H] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Epoxy, Anti-Corrosive, for Metal[, MPI #101].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Epoxy, Anti-Corrosive, for Metal[, MPI #101].
   d. Intermediate Coat in Primed Areas: Epoxy, High Build, Low Gloss[, MPI #108].
   e. Topcoat: Polyurethane, two-component, pigmented, gloss (Gloss Level 6)[, MPI #72].
   f. Second Topcoat: Polyurethane, two-component, pigmented, gloss (Gloss Level 6)[, MPI #72].
   g. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

C. Wood [Columns] [Beams] [Ceilings] [Siding] [and] [Fencing] >Insert item description or drawing designation, or both>:

1. Latex System: [MPI REX 6.2A] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd for Exterior Wood[, MPI #5].
c. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Latex for Exterior Wood[, MPI #6].
d. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd for Exterior Wood[, MPI #5].
e. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Latex for Exterior Wood[, MPI #6].
f. Intermediate Coat: [Latex, exterior, matching topcoat] >Insert requirement or coating designation>.  
g. Topcoat: Latex, exterior flat (Gloss Levels 1-2)[, MPI #10].
h. Topcoat: Latex, exterior, low sheen (Gloss Levels 3-4)[, MPI #15].
i. Topcoat: Latex, exterior semigloss (Gloss Level 5)[, MPI #11].
j. Topcoat: Latex, exterior gloss (Gloss Level 6)[, MPI #119].
k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>

2. Alkyd System: [MPI REX 6.2C] >Insert system description< system[ over a transition coat].
a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd for Exterior Wood[, MPI #5].
c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd for Exterior Wood[, MPI #5].
d. Intermediate Coat: [Latex, exterior, matching topcoat] >Insert requirement or coating designation>.  
e. Topcoat: Alkyd, exterior flat (Gloss Level 1)[, MPI #8].
f. Topcoat: Alkyd, exterior semigloss (Gloss Level 5)[, MPI #94].
g. Topcoat: Alkyd, exterior gloss (Gloss Level 6)[, MPI #9].
h. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>

D. Wood [Doors] [Windows] [Frames] [Casings] [and] [Smooth Fasciae] >Insert item description or drawing designation, or both>:  
1. Latex System: [MPI REX 6.3A] >Insert system description< system[ over a transition coat].
a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd for Exterior Wood[, MPI #5].
c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd for Exterior Wood[, MPI #5].
d. Intermediate Coat: [Latex, exterior, matching topcoat] >Insert requirement or coating designation>.  
e. Topcoat: Latex, exterior flat (Gloss Levels 1-2)[, MPI #10].
f. Topcoat: Latex, exterior, low sheen (Gloss Levels 3-4)[, MPI #15].
g. Topcoat: Latex, exterior semigloss (Gloss Level 5)[, MPI #11].
h. Topcoat: Latex, exterior gloss (Gloss Level 6)[, MPI #119].
i. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

2. Alkyd System: [MPI REX 6.3B] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd for Exterior Wood[, MPI #5].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd for Exterior Wood[, MPI #5].
   d. Intermediate Coat: [Alkyd, exterior, matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Alkyd, exterior flat (Gloss Level 1[, MPI #8].
   f. Topcoat: Alkyd, exterior semigloss (Gloss Level 5[, MPI #94].
   g. Topcoat: Alkyd, exterior gloss (Gloss Level 6[, MPI #9].
   h. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with topcoat.
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with topcoat.
   d. Intermediate Coat: [Exterior varnish matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Varnish, with UV inhibitor, exterior, semigloss (Gloss Level 5[, MPI #30].
   f. Topcoat: Varnish, with UV inhibitor, exterior, gloss (Gloss Level 6[, MPI #29].
   g. Topcoat: Varnish, marine spar, exterior, gloss (Gloss Level 6[, MPI #28].

E. Wood [Deck] [and] [Stairs] <Insert item description or drawing designation, or both>:
1. Latex Porch and Floor System over Alkyd Primer: [MPI REX 6.5A] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd/Oil for Exterior Wood[, MPI #5].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd/Oil for Exterior Wood[, MPI #5].
   d. Intermediate Coat: [Floor Paint, Latex, matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Floor paint, latex, low gloss[, MPI #60].
   f. Topcoat: Floor paint, latex, gloss[, MPI #68].
   g. Topcoat Additive: Manufacturer's standard additive to increase skid resistance of painted surface.
h. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

2. Alkyd Floor Enamel System: [MPI REX 6.5B] >Insert system description< system over a transition coat.
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with topcoat.
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with topcoat.
   d. Intermediate Coat: [Floor enamel matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Floor paint, alkyd, low gloss[, MPI #59].
   f. Topcoat: Floor enamel, alkyd, gloss (Gloss Level 6)[, MPI #27].
   g. Topcoat Additive: Manufacturer's standard additive to increase skid resistance of painted surface.
   h. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

F. Wood [Shingle] [Shake] Siding >Insert item description or drawing designation, or both>:
   1. Latex System: [MPI REX 6.6A] >Insert system description< system over a transition coat.
      a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
      b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd for Exterior Wood[, MPI #5].
      c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd for Exterior Wood[, MPI #5].
      d. Intermediate Coat: [Latex, exterior, matching topcoat] >Insert requirement or coating designation>.
      e. Topcoat: Latex, exterior flat (Gloss Levels 1-2)[, MPI #10].
      f. Topcoat: Latex, exterior, low sheen (Gloss Levels 3-4)[, MPI #15].
      g. Topcoat: Latex, exterior semigloss (Gloss Level 5)[, MPI #11].
      h. Topcoat: Latex, exterior gloss (Gloss Level 6)[, MPI #119].
      i. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

   2. Alkyd System: [MPI REX 6.6B] >Insert system description< system over a transition coat.
      a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
      b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd for Exterior Wood[, MPI #5].
      c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd for Exterior Wood[, MPI #5].
      d. Intermediate Coat: [Latex, exterior, matching topcoat] >Insert requirement or coating designation>.
3.13 INTERIOR HISTORIC PAINTING SCHEDULE

A. [Plaster Ceiling] [Wood Ceiling] >Insert item description or drawing designation, or both>
   1. Historic system[ over a transition coat].
      c. Topcoat: .
      d. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

B. Ferrous Metal Substrates: [Cast-iron grilles] [Wrought-iron railing] >Insert item description or drawing designation, or both>
   1. Latex System: [MPI RIN 5.1N] >Insert system description< system[ over a transition coat].
      a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
      b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Metal, Surface Tolerant[, MPI #23].
      c. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd, Anti-Corrosive for Metal[, MPI #79].
      d. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Rust-Inhibitive, Water Based[, MPI #107].
      e. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Metal, Surface Tolerant[, MPI #23].
      f. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd, Anti-Corrosive for Metal[, MPI #79].
      g. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Rust-Inhibitive, Water Based[, MPI #107].
      h. Intermediate Coat: [Latex matching topcoat] >Insert requirement or coating designation>.
      i. Topcoat: Latex, interior, flat (Gloss Level 1)[, MPI #53].
      j. Topcoat: Latex, interior (Gloss Level 2)[, MPI #44].
      k. Topcoat: Latex, interior (Gloss Level 3)[, MPI #52].
      l. Topcoat: Latex, interior (Gloss Level 4)[, MPI #43].
      m. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
      n. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].
o. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

2. Alkyd System: [MPI RIN 5.1E] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Metal, Surface Tolerant[, MPI #23].
   c. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Alkyd, Anti-Corrosive for Metal[, MPI #79].
   d. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Metal, Surface Tolerant[, MPI #23].
   e. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Alkyd, Anti-Corrosive for Metal[, MPI #79].
   f. Intermediate Coat: [Alkyd, matching topcoat] >Insert requirement or coating designation>.
   g. Topcoat: Alkyd, interior, flat (Gloss Level 1)[, MPI #49].
   h. Topcoat: Alkyd, interior (Gloss Level 3)[, MPI #51].
   i. Topcoat: Alkyd, interior, semigloss (Gloss Level 5)[, MPI #47].
   j. Topcoat: Alkyd, interior, gloss (Gloss Level 6)[, MPI #48].
   k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

3. High-Performance, Pigmented-Polyurethane-over-Epoxy System: [MPI RIN 5.1H] >Insert system description> system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with Epoxy, Gloss[, MPI #77].
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Zinc Rich, Organic[, MPI #18].
   c. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Zinc Rich, Epoxy[, MPI #20].
   d. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Zinc Rich, Organic[, MPI #18].
   e. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Zinc Rich, Epoxy[, MPI #20].
   f. Intermediate Coat in Primed Areas: Epoxy, Gloss[, MPI #77].
   g. Topcoat: Polyurethane, two-component, pigmented, gloss (Gloss Level 6)[, MPI #72].
   h. Second Topcoat: Polyurethane, two-component, pigmented, gloss (Gloss Level 6)[, MPI #72].
   i. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.
C. Wood [Columns] [Beams] [Ceilings] > Insert item description or drawing designation, or both >:

1. Latex System over Latex Primer: [MPI RIN 6.2D] > Insert system description < system over a transition coat >.
   a. Prime Coat: For [MPI DSD 1] > Insert designation < degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Primer, Latex, for Interior Wood[, MPI #39].
   c. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood[, MPI #39].
   d. Intermediate Coat: [Latex, interior, matching topcoat] > Insert requirement or coating designation >.
   e. Topcoat: Latex, interior flat (Gloss Level 1)[, MPI #53].
   f. Topcoat: Latex, interior (Gloss Level 2)[, MPI #44].
   g. Topcoat: Latex, interior (Gloss Level 3)[, MPI #52].
   h. Topcoat: Latex, interior (Gloss Level 4)[, MPI #43].
   i. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
   j. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].
   k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] < Insert color(s) or requirement >.

2. Latex System over Alkyd Primer: [MPI RIN 6.2A] > Insert system description < system over a transition coat >.
   a. Prime Coat: For [MPI DSD 1] > Insert designation < degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Undercoat, Enamel, Interior[, MPI #46].
   c. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Undercoat, Enamel, Interior[, MPI #46].
   d. Intermediate Coat: [Latex, interior, matching topcoat] > Insert requirement or coating designation >.
   e. Topcoat: Latex, interior flat (Gloss Level 1)[, MPI #53].
   f. Topcoat: Latex, interior (Gloss Level 2)[, MPI #44].
   g. Topcoat: Latex, interior (Gloss Level 3)[, MPI #52].
   h. Topcoat: Latex, interior (Gloss Level 4)[, MPI #43].
   i. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
   j. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].
   k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] < Insert color(s) or requirement >.

3. Alkyd System: [MPI RIN 6.2C] > Insert system description < system over a transition coat >.
   a. Prime Coat: For [MPI DSD 1] > Insert designation < degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Undercoat, Enamel, Interior[, MPI #46].
   c. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Undercoat, Enamel, Interior[, MPI #46].
   d. Intermediate Coat: [Alkyd, matching topcoat] > Insert requirement or coating designation >.
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e. Topcoat: Alkyd, interior, flat (Gloss Level 1)[, MPI #49].
f. Topcoat: Alkyd, interior (Gloss Level 3)[, MPI #51].
g. Topcoat: Alkyd, interior, semigloss (Gloss Level 5)[, MPI #47].
h. Topcoat: Alkyd, interior, gloss (Gloss Level 6)[, MPI #48].
i. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

D. Wood [Doors] [Windows] [Frames] [and] [Moldings] >Insert item description or drawing designation, or both>:
1. Latex System over Latex Primer: [MPI RIN 6.3U] >Insert system description> system[ over a transition coat].
a. Prime Coat: For [MPI DSD 1] >Insert designation> <degree of surface degradation, touch up with topcoat.
b. Prime Coat: For [MPI DSD 2] >Insert designation> <degree of surface degradation, spot prime with Primer, Latex, for Interior Wood[, MPI #39].
c. Prime Coat: For [MPI DSD 3] >Insert designation> <degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood[, MPI #39].
d. Intermediate Coat: [Latex, interior, matching topcoat] >Insert requirement or coating designation>.
e. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
f. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].
g. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

2. Low-Odor Latex System over Latex Primer: [MPI RIN 6.3V] >Insert system description> system[ over a transition coat].
a. Prime Coat: For [MPI DSD 1] >Insert designation> <degree of surface degradation, touch up with topcoat.
b. Prime Coat: For [MPI DSD 2] >Insert designation> <degree of surface degradation, spot prime with Primer, Latex, for Interior Wood[, MPI #39].
c. Prime Coat: For [MPI DSD 3] >Insert designation> <degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood[, MPI #39].
d. Intermediate Coat: [Latex, interior, matching topcoat] >Insert requirement or coating designation>.
e. Topcoat: Latex, interior, institutional low odor/VOC flat (Gloss Level 1)[, MPI #143].
f. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 2)[, MPI #144].
g. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 3)[, MPI #145].
h. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 4)[, MPI #146].
i. Topcoat: Latex, interior, institutional low odor/VOC, semigloss (Gloss Level 5)[, MPI #147].
j. Topcoat: Latex, interior, institutional low odor/VOC, gloss (Gloss Level 6)[, MPI #148].
k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>. 

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3. Latex System over Alkyd Primer: [MPI RIN 6.3A] >Insert system description< system [over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Undercoat, Enamel, Interior[, MPI #46].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Undercoat, Enamel, Interior[, MPI #46].
   d. Intermediate Coat: [Latex, interior, matching topcoat] >Insert requirement or coating designation>. 
   e. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
   f. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].
   g. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>. 

4. Alkyd System: [MPI RIN 6.3B] >Insert system description< system [over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Undercoat, Enamel, Interior[, MPI #46].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Undercoat, Enamel, Interior[, MPI #46].
   d. Intermediate Coat: [Alkyd, matching topcoat] >Insert requirement or coating designation>. 
   e. Topcoat: Alkyd, interior, semigloss (Gloss Level 5)[, MPI #47].
   f. Topcoat: Alkyd, interior, gloss (Gloss Level 6)[, MPI #48].
   g. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>. 

   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Shellac[, MPI #88].
   c. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Alkyd, Sanding Sealer, Clear[, MPI #102].
   d. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Shellac[, MPI #88].
   e. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Alkyd, Sanding Sealer, Clear[, MPI #102].
   f. Intermediate Coat: [Interior varnish matching topcoat] >Insert requirement or coating designation>. 
   g. Topcoat: Varnish, interior, flat (Gloss Level 1)[, MPI #73].
   h. Topcoat: Varnish, interior, semigloss (Gloss Level 5)[, MPI #74].
   i. Topcoat: Varnish, interior, gloss (Gloss Level 6)[, MPI #75].
E. Wood [Paneling] [Casework] [and] [Millwork] > Insert item description or drawing designation, or both >:

1. Latex System over Latex Primer: [MPI RIN 6.4T] > Insert system description > system over a transition coat.
   a. Prime Coat: For [MPI DSD 1] > Insert designation < degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Primer, Latex, for Interior Wood[, MPI #39].
   c. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood[, MPI #39].
   d. Intermediate Coat: [Latex, interior, matching topcoat] > Insert requirement or coating designation >.
   e. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
   f. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].
   g. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] < Insert color(s) or requirement >.

2. Low-Odor Latex System over Latex Primer: [MPI RIN 6.4D] > Insert system description > system over a transition coat.
   a. Prime Coat: For [MPI DSD 1] > Insert designation < degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Primer, Latex, for Interior Wood[, MPI #39].
   c. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Primer, Latex, for Interior Wood[, MPI #39].
   d. Intermediate Coat: [Latex, interior, matching topcoat] > Insert requirement or coating designation >.
   e. Topcoat: Latex, interior, institutional low odor/VOC flat (Gloss Level 1)[, MPI #143].
   f. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 2)[, MPI #144].
   g. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 3)[, MPI #145].
   h. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 4)[, MPI #146].
   i. Topcoat: Latex, interior, institutional low odor/VOC, semigloss (Gloss Level 5)[, MPI #147].
   j. Topcoat: Latex, interior, institutional low odor/VOC, gloss (Gloss Level 6)[, MPI #148].
   k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] < Insert color(s) or requirement >.

3. Latex System over Alkyd Primer: [MPI RIN 6.4A] > Insert system description > system over a transition coat.
   a. Prime Coat: For [MPI DSD 1] > Insert designation < degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Undercoat, Enamel, Interior[, MPI #46].
c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Undercoat, Enamel, Interior[, MPI #46].

d. Intermediate Coat: [Latex, interior, matching topcoat] >Insert requirement or coating designation>.  

e. Topcoat: Latex, interior flat (Gloss Level 1)[, MPI #53].  
f. Topcoat: Latex, interior (Gloss Level 2)[, MPI #44].  
g. Topcoat: Latex, interior (Gloss Level 3)[, MPI #52].  
h. Topcoat: Latex, interior (Gloss Level 4)[, MPI #43].  
i. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].  
j. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].  
k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

4. Alkyd System: [MPI RIN 6.4C] >Insert system description< system[ over a transition coat].  
a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.  
b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Undercoat, Enamel, Interior[, MPI #46].  
c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Undercoat, Enamel, Interior[, MPI #46].  
d. Intermediate Coat: [Alkyd, matching topcoat] >Insert requirement or coating designation>.  
e. Topcoat: Alkyd, interior flat (Gloss Level 1)[, MPI #49].  
f. Topcoat: Alkyd, interior (Gloss Level 3)[, MPI #51].  
g. Topcoat: Alkyd, interior, semigloss (Gloss Level 5)[, MPI #47].  
h. Topcoat: Alkyd, interior, gloss (Gloss Level 6)[, MPI #48].  
i. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

5. Alkyd Varnish System over Stain: [MPI RIN 6.4F] <Insert system description>.  
a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.  
b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Stain, Semi-Transparent, for Interior Wood[, MPI #90].  
c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Stain, Semi-Transparent, for Interior Wood[, MPI #90].  
d. Intermediate Coat: [Interior varnish matching topcoat] >Insert requirement or coating designation>.  
e. Topcoat: Varnish, interior, flat (Gloss Level 1)[, MPI #73].  
f. Topcoat: Varnish, interior, semigloss (Gloss Level 5)[, MPI #74].  
g. Topcoat: Varnish, interior, gloss (Gloss Level 6)[, MPI #75].  
h. Stain Color: Match [adjacent, cleaned wood of same type] [color indicated in the Historic Structure Report] [color indicated on Drawings] >Insert color or requirement>.

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F. Wood [Floors] [and] [Stairs] >Insert item description or drawing designation, or both<:

1. Latex Porch and Floor System over Alkyd Primer: [MPI RIN 6.5J] >Insert system description> system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer Sealer, Alkyd, Interior[ , MPI #45].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer Sealer, Alkyd, Interior[ , MPI #45].
   d. Intermediate Coat: [Floor Paint, Latex, matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Floor paint, latex, low gloss[, MPI #60].
   f. Topcoat: Floor paint, latex, gloss[, MPI #68].
   g. Topcoat Additive: Manufacturer's standard additive to increase skid resistance of painted surface.
   h. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

2. Alkyd Floor Enamel System: [MPI RIN 6.5A] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with topcoat.
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with topcoat.
   d. Intermediate Coat: [Floor enamel matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Floor paint, alkyd, low gloss[, MPI #59].
   f. Topcoat: Floor enamel, alkyd, gloss (Gloss Level 6)[, MPI #27].
   g. Topcoat Additive: Manufacturer's standard additive to increase skid resistance of painted surface.
   h. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with topcoat.
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with topcoat.
   d. Intermediate Coat: [Interior varnish matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Varnish, interior, polyurethane, oil modified, gloss[, MPI #56].

   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
b. Prime Coat: For [MPI DSD 2] >**Insert designation**< degree of surface degradation, spot prime with topcoat.

c. Prime Coat: For [MPI DSD 3] >**Insert designation**< degree of surface degradation, fully prime coat with topcoat.

d. Intermediate Coat: [Aliphatic polyurethane varnish matching topcoat] >**Insert requirement or coating designation**<.

e. Topcoat: Varnish, aliphatic polyurethane, two-component, [MPI #78].


a. Prime Coat: For [MPI DSD 1] >**Insert designation**< degree of surface degradation, touch up with topcoat.

b. Prime Coat: For [MPI DSD 2] >**Insert designation**< degree of surface degradation, spot prime with Stain, Semi-Transparent, for Interior Wood[, MPI #90].

c. Prime Coat: For [MPI DSD 3] >**Insert designation**< degree of surface degradation, fully prime coat with Stain, Semi-Transparent, for Interior Wood[, MPI #90].

d. Intermediate Coat: [Moisture-cured polyurethane varnish matching topcoat] >**Insert requirement or coating designation**<.

e. Topcoat: Varnish, polyurethane, moisture cured, gloss (Gloss Level 6)[, MPI #31].

f. Stain Color: Match [adjacent, cleaned wood of same type] [color indicated in the Historic Structure Report] [color indicated on Drawings] >**Insert color or requirement**<.

G. [Plaster] >**Insert item description or drawing designation, or both**:<

1. Latex System over Waterborne Primer: [MPI RIN 9.2A] >**Insert system description**< system[ over a transition coat].

a. Prime Coat: For [MPI DSD 1] >**Insert designation**< degree of surface degradation, touch up with topcoat.

b. Prime Coat: For [MPI DSD 2] >**Insert designation**< degree of surface degradation, spot prime with Primer Sealer, Latex, Interior[, MPI #50].

c. Prime Coat: For [MPI DSD 2] >**Insert designation**< degree of surface degradation, spot prime with Primer, Stain Blocking, Water Based[, MPI #137].

d. Prime Coat: For [MPI DSD 3] >**Insert designation**< degree of surface degradation, fully prime coat with Primer Sealer, Latex, Interior[, MPI #50].

e. Prime Coat: For [MPI DSD 3] >**Insert designation**< degree of surface degradation, fully prime coat with Primer, Stain Blocking, Water Based[, MPI #137].

f. Intermediate Coat: [Latex matching topcoat] >**Insert requirement or coating designation**<.

g. Topcoat: Latex, interior, flat (Gloss Level 1)[, MPI #53].

h. Topcoat: Latex, interior (Gloss Level 2)[, MPI #44].

i. Topcoat: Latex, interior (Gloss Level 3)[, MPI #52].

j. Topcoat: Latex, interior (Gloss Level 4)[, MPI #43].

k. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].

l. Topcoat: Latex, interior, gloss (Gloss Level 6)[, MPI #114].

m. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] >**Insert color(s) or requirement**<.
2. Low-Odor Latex System over Waterborne Primer: [MPI RIN 9.2M] >Insert system description> system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer Sealer, Latex, Interior[, MPI #50].
   c. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer, Stain Blocking, Water Based[, MPI #137].
   d. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer Sealer, Latex, Interior[, MPI #50].
   e. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat with Primer, Stain Blocking, Water Based[, MPI #137].
   f. Topcoat: Latex, interior, institutional low odor/VOC flat (Gloss Level 1)[, MPI #143].
   g. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 2)[, MPI #144].
   h. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 3)[, MPI #145].
   i. Topcoat: Latex, interior, institutional low odor/VOC (Gloss Level 4)[, MPI #146].
   j. Topcoat: Latex, interior, institutional low odor/VOC, semigloss (Gloss Level 5)[, MPI #147].
   k. Topcoat: Latex, interior, institutional low odor/VOC, gloss (Gloss Level 6)[, MPI #148].
   l. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

3. Latex System over Alkyd Primer: [MPI RIN 9.2K] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
   b. Prime Coat: For [MPI DSD 2] >Insert designation< degree of surface degradation, spot prime with Primer Sealer, Alkyd, Interior[, MPI #45].
   c. Prime Coat: For [MPI DSD 3] >Insert designation< degree of surface degradation, fully prime coat Primer Sealer, Alkyd, Interior[, MPI #45].
   d. Intermediate Coat: [Latex matching topcoat] >Insert requirement or coating designation>.
   e. Topcoat: Latex, interior, flat (Gloss Level 1)[, MPI #53].
   f. Topcoat: Latex, interior (Gloss Level 2)[, MPI #44].
   g. Topcoat: Latex, interior (Gloss Level 3)[, MPI #52].
   h. Topcoat: Latex, interior (Gloss Level 4)[, MPI #43].
   i. Topcoat: Latex, interior, semigloss (Gloss Level 5)[, MPI #54].
   j. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] <Insert color(s) or requirement>.

4. Alkyd System: [MPI RIN 9.2C] >Insert system description< system[ over a transition coat].
   a. Prime Coat: For [MPI DSD 1] >Insert designation< degree of surface degradation, touch up with topcoat.
b. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Primer Sealer, Latex, Interior[, MPI #50].

c. Prime Coat: For [MPI DSD 2] > Insert designation < degree of surface degradation, spot prime with Primer, Stain Blocking, Water Based[, MPI #137].

d. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Primer Sealer, Latex, Interior[, MPI #50].

e. Prime Coat: For [MPI DSD 3] > Insert designation < degree of surface degradation, fully prime coat with Primer, Stain Blocking, Water Based[, MPI #137].

f. Intermediate Coat: [Alkyd, matching topcoat] > Insert requirement or coating designation >.

g. Topcoat: Alkyd, interior, flat (Gloss Level 1)[, MPI #49].

h. Topcoat: Alkyd, interior (Gloss Level 3)[, MPI #51].

i. Topcoat: Alkyd, interior, semigloss (Gloss Level 5)[, MPI #47].

j. Topcoat: Alkyd, interior, gloss (Gloss Level 6)[, MPI #48].

k. Color: Match [Munsell Color 10 G 8/2] [Plochere Color System #8da399] [colors indicated in the Historic Structure Report] [colors indicated on Drawings] < Insert color(s) or requirement >.

END OF SECTION
SECTION 09 24 00 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Exterior vertical plasterwork (stucco).
   2. Exterior horizontal and nonvertical plasterwork (stucco).

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 03 20 "Historic Treatment of Plaster" for cement plaster restoration at roof elements and around window openings scheduled for window replacement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and texture specified.

C. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches, and prepared on rigid backing.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.
      a. Size: 50 sq. ft. in surface area.
   2. For interior plasterwork, simulate finished lighting conditions for review of mockups.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.
1.6 FIELD CONDITIONS

A. Comply with ASTM C 926 requirements.
B. Exterior Plasterwork:
   1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
   2. Apply plaster when ambient temperature is greater than 40 degrees F.
   3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
C. Interior Plasterwork: Maintain room temperatures at greater than 40 degrees F for at least 48 hours before plaster application, and continuously during and after application.
   1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
   2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.
D. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.

2.2 ACCESSORIES

A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
B. Metal Accessories:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. CEMCO; California Expanded Metal Products Co.
      b. ClarkDietrich Building Systems.
      c. MarinoWARE.
      a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
      b. Smallnose cornerbead with perforated flanges; use on curved corners.
      c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
      d. Bullnose cornerbead, radius 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.
   4. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
2.3 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.
C. Bonding Compound: ASTM C 932.
D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.

2.4 PLASTER MATERIALS

A. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color to match Architect's sample.
B. Perlite Aggregate: ASTM C 35.
   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. El Rey Stucco Solutions; a Parex USA, Inc. brand; Premium Stucco Finish.
      b. SonoWall, BASF Wall Systems, Inc.; Thoro Stucco.
      c. STO Corporation.
D. Acrylic-Based Finish Coatings: Factory-mixed acrylic-emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.
   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. El Rey Stucco Solutions; a Parex USA, Inc. brand.; Perma-Flex Medium Finish.
      c. SonoWall, BASF Wall Systems, Inc.; StuccoTex Medium Finish
      d. Sto Corp.; StoPowerwall Medium Finish.

2.5 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.
   1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.
B. Base-Coat Mixes for Use over Unit Masonry: Single base (scratch) coat for two-coat plasterwork on low-absorption plaster bases as follows:
   1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 0 to 3/4 part lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
C. Base-Coat Mixes for Use over Unit Masonry: Single base (scratch) coat for two-coat plasterwork on high-absorption plaster bases as follows:
   1. Portland Cement Mix: For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLATION, GENERAL

A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

3.4 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings.
B. Reinforcement for External (Outside) Corners:
   1. Install lath-type, external-corner reinforcement at exterior locations.
   2. Install corner bead at interior locations.

3.5 PLASTER APPLICATION

A. General: Comply with ASTM C 926.
   1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
   2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
   3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
B. Bonding Compound: Apply on substrates for direct application of plaster.
C. Walls; Base-Coat Mix: For base (scratch) coat, for two-coat plasterwork and having 3/8-inch thickness on masonry, as follows:
   1. Portland cement mix.
   2. Portland and plastic cement mix.
D. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.
E. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.
F. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.
3.6 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.7 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION
SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Quarry tile.
   2. Porcelain tile.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

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. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

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 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. Assembled samples mounted on a rigid panel, with grouted joints, for each type and
      composition of tile and for each color and finish required. Make samples at least 12
      inches square, but not fewer than four tiles. Use grout of type and in color or colors
      approved for completed Work.
   3. Full-size units of each type of trim and accessory for each color and finish required.
   4. Stone thresholds in 6-inch lengths.
   5. Metal edge strips in 6-inch lengths.
1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Product Certificates: For each type of product.
C. 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 or a Trowel of Excellence member of the Tile Contractors' Association of America.
   2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
   3. Installer employs Ceramic Tile Education Foundation Certified Installers.

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 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.
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.

2.2 TILE PRODUCTS

A. Tile Type: Unglazed square-edged quarry tile.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      b. Arizona Tile.
      c. Daltile.
   2. Face Size: 6 by 6 inches.
   3. Thickness: 1/2 inch.
   5. Dynamic Coefficient of Friction: Not less than 0.42.
   6. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
   7. Grout Color: As selected by Architect from manufacturer's full range.
   8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
      a. Base: Coved with surface bullnose top edge, face size 6 by 6 inches.

2.3 SETTING MATERIALS

A. Medium-Bed, Modified Dry-Set Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Custom Building Products.
      b. LATICRETE SUPERCAP, LLC.
      c. MAPEI Corporation.
   2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.

2.4 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Bostik, Inc.
      b. Custom Building Products.
      c. LATICRETE SUPERCAP, LLC.
2.5 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. 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.

C. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.6 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 floors installed 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 installed with with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
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95% Construction Documents

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot 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 CERAMIC TILE INSTALLATION

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.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
   a. Tile floors consisting of tiles 8 by 8 inches or larger.
   b. Tile floors consisting of rib-backed tiles.

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: Unless otherwise indicated, install tile with the following joint widths:

1. Quarry Tile: 1/16 inch.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

I. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer from tile faces by wiping with a soft cloth.
3.4 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. Sound tile after setting and replace any hollow sounding units.

C. Cleaning: On completion of placement and grouting, clean all 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.

3.5 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
SECTION 09 51 23 - 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.

C. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 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 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 long Sample of each type.
   3. Exposed Moldings and Trim: Set of 6-inch long Samples of each type and color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.

C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes 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. Acoustical Ceiling Units: Full-size tiles equal to three cases of quantity installed.
   2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.
1.7 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.

1.8 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. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E 1264.

2. Smoke-Developed Index: 50 or less.

B. Fire-Resistance Ratings: Comply with ASTM E 119; 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)

A. Basis-of-Design Product: Subject to compliance with requirements, provide USG Eclipse ClimaPlus or comparable product by one of the following:

1. Armstrong World Industries, Inc.

2. United States Gypsum Company.

B. Acoustical Tile Standard: Provide manufacturer’s standard tiles of configuration indicated that comply with ASTM E 1264 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: Square (SQ); 2 feet by 4 feet by 3/4 inches.
2. Pattern: E(lightly textured) and as indicated by manufacturer's designation.
D. Color: White.
E. Light Reflectance (LR): Not less than 0.80.
F. Ceiling Attenuation Class (CAC): Not less than 35.
G. Noise Reduction Coefficient (NRC): Not less than 0.70.
H. Edge/Joint Detail: Square.
I. Thickness: 3/4 inch.
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 D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM (SG-1)
A. Basis-of-Design Product: Subject to compliance with requirements, provide USG DX / DXL (15/16-inch) or comparable product by one of the following:
1. Armstrong World Industries, Inc.
2. United States Gypsum Company.
B. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation.
1. Structural Classification: Heavy-duty system.
2. Access: Upward and 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.

2.5 ACCESSORIES
A. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

2.6 ACOUSTICAL SEALANT
A. Acoustical Sealant: As specified in Section 07 92 00 "Joint Sealants."

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 C 636/C 636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Utilize existing wire hangers to extents feasible. If new hangers are required, install 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. 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.
   3. 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.
   4. 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.
   5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
   6. 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 suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. 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 o.c.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
B. Directly Attached Ceilings: Install bottom surface of tiles to a tolerance of 1/8 inch in 12 feet and not exceeding 1/4 inch cumulatively.

C. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 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
SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resilient Base.
   2. Resilient transitions.

B. Related Requirements:
   1. Division 01 Specification Sections apply to work of this section.

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, not less than 6 inches long.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 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 degrees F or more than 90 degrees F.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F, in spaces to receive resilient products during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F or more than 95 degrees F.

C. Install resilient products after other finishing operations, including painting, have been completed.
PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Roppe Corporation, USA.
      b. Type TP: Rubber, thermoplastic.
      c. Group 2: Layered (multiple layers).
      d. Style: B Cove.
      e. Materials Height: 4 inches.
      g. Material Length: 48 inch sections.
      h. Material & Composition: Unique blend of a thermoplastic and rubber backing covered with a durable colored top layer.
      i. Color: As indicated on Material Legend.
      j. Surfacing Burning: Class A.
      k. Flammability/ Critical Radiant Flux: Class 1.
      l. Outside Corners: Job Formed.
      m. Inside Corners: Job Formed.

2.2 RESILIENT TRANSITIONS:

A. Manufacturers: Subject to compliance with requirements, provide the following:
   1. Roppe Corporation, USA.

B. Description: Rubber Transition.

C. Transition Locations:
   1. CPT or LVT to existing flooring material.
      a. All locations, unless noted otherwise.
   2. Color: As selected from manufacturer's full range of colors and as indicated in Material Legend in Drawings.
   3. Size requirements:
      a. Contractor shall verify and select appropriate heights of specified transitions to meet the varying thickness of material and installation methods indicated.
      b. Transitions shall be installed in maximum lengths to minimize running joints at all transition locations.

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.
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. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
C. 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.
D. 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. Job-Formed Corners:
   1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 9 inches in length.
      a. Form without producing discoloration (whitening) at bends.
      b. Miter and cope outside corners of profiled base for tight fit to wall.
   2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 9 inches 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.
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
SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Luxury Vinyl Tile.

B. Related Requirements:
   1. Division 01 Specification Sections apply to work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Samples: For each exposed product and for each color and pattern specified.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.4 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.

1.5 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 degrees F or more than 90 degrees F. Store floor tiles on flat surfaces.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F, 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 degrees F or more than 95 degrees F.

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 E 648 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

A. Basis-of-design product: Subject to compliance with requirements, provide Interface| Level Set, Woodgrains, or comparable product by one of the following.
   1. American Biltrite.
   2. Armstrong World Industries, Inc.
   3. Congoleum Corporation.
   4. Johnsonite; A Tarkett Company.
   5. Mannington Mills, Inc.

B. Tile Standard: ASTM F 1066, Class 3, Surface Pattern.

C. Wearing Surface: Embossed.

D. Thickness: 4.4 mm.

E. Size: 25 cm by 100 cm.

F. Colors and Patterns: Refer to Material Legend.

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.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile 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 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 F 710.
   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 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
   a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of in 24 hours.
   b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. 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.

F. 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 with grain running in one direction.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, 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. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
E. Cover floor tile until Substantial Completion.

END OF SECTION
SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes modular carpet tile.
B. Related Requirements:
   1. Division 01 Specification Sections apply to work of this Section.

1.2 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. 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.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
B. Sample Warranty: For special warranty.

1.4 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.

1.5 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. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 square yards.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

1.8 FIELD CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" 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.

1.9 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Mohawk Group (The); Mohawk Carpet, LLC.
   2. Shaw Contract Group; a Berkshire Hathaway company.
B. Color: Refer to Materials Legend.
C. Pattern: Refer to Material Legend.
D. Fiber Content: 100 percent nylon 6, 6.
E. Fiber Type: Nylon.
F. Pile Characteristic: 2.5 mm for finished carpet tile according to ASTM D 6859.
G. Total Weight: 20 oz./sq. yd. for finished carpet tile.
H. Primary Backing/Backcoating: Manufacturer's standard composite materials.
I. Secondary Backing: Manufacturer's standard material.
J. Size: 50 by 50 cm.
K. Applied Treatments:
   2. Antimicrobial Treatment:
      a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
L. Performance Characteristics:
1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D 2646.
4. Tuft Bind: Not less than 5 lbf according to ASTM D 1335.
5. Delamination: Not less than 3.5 lbf/in. according to ASTM D 3936.
6. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
7. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
9. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
10. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
11. Electrostatic Propensity: 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: 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.

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 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
   a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water per 1000 sq. ft. in 24 hours.
   b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
   c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
D. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" 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 material legend.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

H. Install pattern parallel to walls and borders.

I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

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.


B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

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
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SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
   1. Clay masonry.
   2. Steel.
   4. Exterior portland cement plaster (stucco).

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 96 00 "High-Performance Coatings" for special-use coatings.
   3. Section 09 91 23 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.
   4. Section 09 93 00 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, a high-side sheen flat, velvet-like finish.
C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.
E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples for Initial Selection: 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 square.
   2. Step coats on Samples 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 List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. VOC content.
1.4 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture's label with the following information:
   1. Product name and type (description).
   2. Batch date.
   3. Color number.
   4. VOC content.
   5. Environmental handling requirements.
   6. Surface preparation requirements.
   7. Application instructions.
B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
Hazardous Materials: Hazardous materials including lead paint are present in buildings and structures to be painted. A report on the presence of known hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified.
2. Perform preparation for painting of substrates known to include lead paint in accordance with EPA Renovation, Repair and Painting Rule and additional requirements of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company products indicated or comparable product from one of the following:
   1. Benjamin Moore & Co.
   2. PPG Architectural Finishes, Inc.
B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
   1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL
A. Standards: Provide products that comply with Manufacture's Premium 1st Quality standards indicated and like VOC limits.
B. 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.
C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
D. Colors: Match Architect's samples or as indicated in a color schedule.

2.3 SOURCE QUALITY CONTROL
A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   a. Concrete: 12 percent.
   b. Masonry (Clay and CMU): 12 percent.
   c. Wood: 15 percent.
   d. Portland Cement Plaster: 12 percent.
   e. Gypsum Board: 12 percent.

2. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

3. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
   1. SSPC-SP 2, "Hand Tool Cleaning."
   2. SSPC-SP 3, "Power Tool Cleaning."
   3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
   4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
   4. Paint entire exposed surface of window frames and sashes.
   5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. 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.

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 EXTERIOR PAINTING SCHEDULE

A. Clay Masonry Portland Cement Plaster (Stucco), Nontraffic Surfaces:
   1. Latex System:
      c. Topcoat: Latex, exterior, semi-gloss (Gloss Level 5): S-W Solo Acrylic Semi-Gloss, A76 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

B. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates:
   1. Water-Based Light Industrial Coating System:
      a. Prime Coat: Primer, water-based, anti-corrosive for metal: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
      b. Prime Coat: Shop primer specified in Section where substrate is specified.
      d. Topcoat: Light industrial coating, exterior, water based, semi-gloss (Gloss Level 5): S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

END OF SECTION
SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Surface preparation and the application of paint systems on the following interior substrates:
      a. Concrete masonry units (CMU).
      b. Steel.
      c. Galvanized metal.
      d. Aluminum (not anodized or otherwise coated).
      e. Wood.
      f. Gypsum board.
      g. Plaster.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 96 00 "High-Performance Coatings" for high-performance and special-use coatings.
   3. Section 09 91 13 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
   4. Section 09 93 00 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, a high-side sheen flat, velvet-like finish.
C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.
E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples for Initial Selection: For each type of topcoat product.
C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.
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D. Product List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same
      designations indicated on Drawings and in schedules.
   2. VOC content.

1.4 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Provide coating maintenance manual including area
   summary with finish schedule, area detail designating location where each
   product/color/finish was used, product data pages, material safety data sheets, care and
   cleaning instructions, touch-up procedures, and color samples of each color and finish
   used.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish
   selected to verify preliminary selections made under Sample submittals and to demonstrate
   aesthetic effects and set quality standards for materials and execution.
   1. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
      a. Other Items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of
         additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract
      Documents contained in mockups unless Architect specifically approves such
      deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of
      the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in
   manufacturer's original sealed containers, complete with labels and instructions for
   handling, storing, unpacking, protecting, and installing. Packaging shall bear the
   manufacturer's label with the following information:
   1. Product name and type (description).
   2. Batch date.
   3. Color number.
   4. VOC content.
   5. Environmental handling requirements.
   6. Surface preparation requirements.
   7. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with
   ambient temperatures continuously maintained at not less than 45 degrees F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.
1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
C. Lead Paint: It is not expected that lead paint will be encountered in the Work.
   1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.
D. Lead Paint: Lead paint may be present in buildings and structures to be painted. A report on the presence of lead paint is on file for review and use. Examine report to become aware of locations where lead paint is present.
   1. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified.
   2. Perform preparation for painting of substrates known to include lead paint in accordance with EPA Renovation, Repair and Painting Rule and additional requirements of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company products indicated or comparable product from one of the following:
   1. Benjamin Moore & Co.
   2. PPG Architectural Finishes, Inc.
B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
   1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

A. Standards: Provide products that comply with Manufacture's Premium 1st Quality standards indicated and like VOC limits.
B. 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.
C. Colors: Match Architect's samples or as indicated in a color schedule.
2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
   1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:
   1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
      a. Concrete: 12 percent.
      b. Masonry (Clay and CMU): 12 percent.
      c. Wood: 15 percent.
      d. Gypsum Board: 12 percent.
      e. Plaster: 12 percent.
   2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
   3. Plaster Substrates: Verify that plaster is fully cured.
   4. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.
3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer. but not less than the following:
   1. SSPC-SP 2, "Hand Tool Cleaning."
   2. SSPC-SP 3, "Power Tool Cleaning."
   3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
   4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove loose surface oxidation.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
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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.
B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:
1. Latex System:
   a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 100 to 200 sq. ft. per gal.
2. Water-Based Light Industrial Coating System:
   a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 100 to 200 sq. ft. per gal.
   c. Topcoat: Light industrial coating, interior, water based, semi-gloss (Gloss Level 5): S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.
B. Metal Substrates (Aluminum, Steel, Galvanized Steel):
1. Latex System:
   a. Prime Coat: Primer, rust-inhibitive, water based: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
2. Water-Based Light Industrial Coating System:
   a. Prime Coat: Primer, rust-inhibitive, water based: S-W Pro Industrial Pro-Cryl
      Universal Primer, B66-310 Series, at 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
   b. Intermediate Coat: Light industrial coating, interior, water based, matching
      topcoat.
   c. Topcoat: Light industrial coating, interior, water based, semi-gloss (Gloss
      Level 5): S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151
      Series, at 4.0 mils wet, 1.5 mils dry, per coat.

3. Acrylic/Alkyd System:
   a. Prime Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at
      5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
      Waterbased Acrylic-Alkyd Semi-Gloss, B34-8200 Series, at 4.0 mils wet, 1.7
      mils dry, per coat.
   d. Topcoat: Water-based acrylic-alkyd, gloss, interior: S-W ProMar 200
      Waterbased Acrylic-Alkyd Gloss, B35-8200 Series, at 4.0 mils wet, 1.7 mils
      dry, per coat.

C. Wood Substrates: Including exposed wood items not indicated to receive shop-applied
   finish.

   1. Latex System:
      a. Prime Coat: Primer sealer, latex, interior: S-W PrepRite ProBlock Primer
         Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry.
         VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils wet, 1.6 mils dry, per
         coat.

   2. Acrylic/Alkyd System:
         Primer, B28W8111, at 4.0 mils wet, 1.8 mils dry.
         Waterbased Acrylic-Alkyd Semi-Gloss, B34-8200 Series, at 4.0 mils wet, 1.7
         mils dry, per coat.
      d. Topcoat: Water-based acrylic-alkyd, gloss, interior: S-W ProMar 200
         Waterbased Acrylic-Alkyd Gloss, B35-8200 Series, at 4.0 mils wet, 1.7 mils
         dry, per coat.

D. Gypsum Board and Cement Plaster Substrates:
   1. Latex System:
      a. Prime Coat: Primer, latex, interior: S-W ProMar 200 Zero VOC Latex Primer,
         B28W2600, at 4.0 mils wet, 1.5 mils dry.
         VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils wet, 1.6 mils dry, per
         coat.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and application (historic restoration) of wood stains and transparent finishes
   1. Interior Substrates:
      a. Dressed lumber (finish carpentry or woodwork).
      b. Wood floors and stairs.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 91 23 "Interior Painting" for stains and transparent finishes on concrete floors.

1.2 DEFINITIONS

A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
   1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   2. Indicate VOC content.
B. Samples for Initial Selection: For each type of product.
C. Samples for Verification: For each type of finish system and in each color and gloss of finish required.
   1. Submit samples on representative samples of actual wood substrates, 8 inches square.
   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.
1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Final approval of stain color selections will be based on mockups.
      a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 degrees F.
B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Benjamin Moore & Co.
   2. Dunn-Edwards Corporation.
   3. Duron, Inc.
   5. Lenmar Lacquers; Benjamin Moore & Co.
   6. PPG Architectural Finishes, Inc.
   7. Sherwin-Williams Company (The).

2.2 MATERIALS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
B. Material Compatibility:
   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
C. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Primers, Sealers, and Undercoaters: 100 g/L.
2. Clear Wood Finishes, Varnishes: 275 g/L.
3. Clear Wood Finishes, Lacquers: 275 g/L.
4. Shellacs, Clear: 730 g/L.
5. Stains: 100 g/L.
D. Stain Colors: Match Architect's samples.

2.3 CONTROL

A. Testing of Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
C. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
E. Proceed with finish application only after unsatisfactory conditions have been corrected.
1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.
3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
   1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
   1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
   2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Interior Wood Substrates:
   1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
   2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
   3. Sand surfaces exposed to view and dust off.
   4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
   1. Use applicators and techniques suited for finish and substrate indicated.
   2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
   3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.
3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Wood trim architectural woodwork.
B. Wood Substrates:
C. Wood Substrates: Traffic surfaces including floors and stair treads.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and application of high-performance coating systems on the following substrates:
   1. Interior Substrates:
      a. Floor and wall tile (glazed ceramic and porcelain); vertical and horizontal surfaces at public restrooms and in student bathing areas.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 91 23 “Interior Painting” for special-use coatings and general field painting.

1.2 DEFINITIONS

A. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
B. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.
B. Samples for Initial Selection: For each type of topcoat product indicated.
C. Samples for Verification: For each type of coating system and in each color and gloss of topcoat indicated.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

1.4 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture's label with the following information:
   1. Product name and type (description).
   2. Batch date.
   3. Color number.
   4. Environmental handling requirements.
5. Surface preparation requirements.
6. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 degrees F.
B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
C. Do not apply exterior coatings in snow, rain, fog, or mist.
D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated:
   1. Miracle Method Surface Refinishing; as stipulated by the Owner.
B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
   1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 APPLICATOR REQUIREMENTS

A. Applicator must have a minimum 5 years of substantiated experience performing similar work for colleges and universities that have used the specified refinishing process. Applicator must present completed project references from said institutions upon request.
B. All refinishing of glazed porcelain and tile will utilize a surface refinishing process that creates a membrane over the surface and penetrates porous surfaces; binding its components together.
C. The process must not include the use of hydrofluoric acids to etch the surface and potentially expose contaminants to the air or chemical burns to the technician.
D. All technicians must have completed a certified training and safety program.
E. Applicator must be able to provide choices of colors, finishes, and textures.

2.3 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each coating 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 coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.

3. Provide products of same manufacturer for each coat in a coating system.

2.4 SURFACE REFINISHING SYSTEM

A. Systems for over-glazing ceramic and porcelain tile surfaces (horizontal and vertical applications) include:

1. Cleaners and Primers:
   a. Proprietary cleaners and primers used to create a neutral PH of 7 on existing surfaces to ensure adequate bonding between existing surface and newly applied high performance coating.
   b. Surfaces must be cleaned using a two-step process to physically and chemically remove soap film, scale, mineral deposits, body oil, grease and organic compounds. The two-step cleaners must create a neutral PH surface, which is critical to the bonding process.
   c. Surfaces must be primed using a two-component, fast dry, high build polyamide epoxy primer, (tinted as needed) is required with a 4-5 mil wet and 3.5 mil dry thickness when applied.

2. Bonding Agents:
   a. Non-acid bonding agent (MM-4) for proper adhesion of high performance coatings to original surfaces.
   b. A bonding agent specifically engineered to work on glazed surfaces, such as ceramic tile and porcelain. The bonding agent is required to have an epoxy component that will ensure adhesion, and bonding on any hard surface, particularly glass-like surfaces. Etching acids, such as hydrofluoric acid are not acceptable substitutes for the bonding agent.

3. Epoxy Sealing Intermediate Coat:
   a. An epoxy coating system formulated to cure under water and permanently seal substrates exposed to high levels of water exposure (tile shower pans, flooring and wall surfaces).
   b. A proprietary sealing epoxy (Mira Seal) that cures underwater, providing a secure, water-tight membrane.

4. Slip Resistant Surfaces:
   a. Water based stone look finish used as a slip resistant surface (SRS), applied to shower pans and bathtub bottoms to increase friction coefficient at refinished glazed surface.
   b. Multicolor, Natural Accents topcoat containing modified polymer particles suspended within a modified terpolymer water phase composite. The product should be ready-to-spray using HVLP spray equipment. Adjustments to viscosity may be made with water, not to exceed 5 percent of total volume.

5. Clear Coat:
   a. An application of an abrasive, water and chemical resistant urethane to create a watertight seal over the color finish.
   b. Mira-Clear; fast drying clear coat sealer to be used for accelerated completed in one day.
   c. Antimicrobial clear coat; finish coat with a silver-ion additive to prevent the growth of harmful bacteria on the protected surface.
   d. Polyaspartic: An aliphatic polyurea, low VOC clear coat used when reduced odor and fast dry times are required.
2.5 CLEAR COATINGS

A. Solvent-based, multi-component, satin finish urethane clear coat used to promote the durability of the final coating of the system.
   1. Clear coating must meet the following requirements:
      a. Sheen: Gloss 15 plus or minus 5.
      b. Flexibility: Minimum 1/4 gapping must pass with no cracks or leakage.
      c. Direct Impact: Must pass 80 in. lbs. at mill dry film.
      d. Reverse Impact: Must pass 80 in. lbs. at mill dry film.
      e. Immersion Test: Applied detergent (5 percent mixture) with 7 hours minimum exposure must result in no negative colorations changes or system leakage.

2.6 FINISHES

A. Colors: As indicated in color schedule.

2.7 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

D. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the coating’s manufacturer. Minimum 60 degrees for interiors.

E. Follow manufacturer’s recommended procedures for producing best results. Mask, clean, ventilate, and use of bonding, repairs, best primers and topcoats.
3.2 PREPARATION

   A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be coated. 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 coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

   B. Clean substrates of substances that could impair bond of coatings, 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 coating systems indicated.

3.3 SURFACE PREP AND APPLICATION FOR HORIZONTAL AND VERTICAL TILE SURFACES

   A. Protect the floor and adjacent surfaces not scheduled to receive epoxy coating system. Mask areas to protect other surfaces from over spray. Remove old caulk.
      1. Have plumbing fixtures removed by licensed plumber, as necessary. Remove or mask unfinished louvers, grilles, covers and access panels on mechanical and electrical components.
      2. Fill and repair any cracks or chips that can be seen or felt per manufacturer requirements. Remove and repair all loose and missing grout.
      3. Set up UL approved exhaust fan and tubing (min 2000 cubic feet per minute) to vent odor and overspray safely out of the area.
      4. Use two-step cleaning process to remove all mineral deposits, soap scum, dirt and body oils to necessary neutral PH levels for proper adhesion of the finish coats. Do not use toxic etching acids or any form of hydrofluoric acid that can damage plumbing or harm the technician.
      5. Apply bonding agent to ensure adhesion of new coating on porcelain or ceramic tile surfaces. Bonding agent consists of two components to create a chemical bond between the old surface and the new finish.
      6. Apply two or more coats of appropriately tinted primer over bonded surface. Allow proper time for the primer coats to dry.
      7. Apply slip resistant surface if desired or required. Apply two or more coats of Natural Accents to the primed surface using a HVLP system to ensure even coats.
      8. Apply two to three coats of clear acrylic to protect the cured Natural Accents surface using a HVLP system to ensure even coats. Coating should be uniform in appearance and gloss without runs, drips, rough spots, or orange peel.
      9. Remove masking paper and clean job site.
     10. Reinstall all plumbing fixtures removed prior to application. Re-caulk as necessary.
     11. Return to service in 24-hours.

3.4 FINAL SEAL COAT FOR WET AREAS

   A. Mira-Seal provides a permanent seal against damage from water and most chemical leaks.
      1. Apply using a roller after repairs and bonding agent is applied.
      2. Allow Mira-Seal to cure for 24-hours.
Broadcast color accent chips over the floor surface in customer/architects choice of colors and predetermined percentage of coverage. Scrape and sweep excess accent chips off of surface.

Apply two or more coats of Mira-Seal to protect the color accent chips to provide an additional water barrier.

Remove masking paper and clean job site. Return to service in 24-hours.

3.5 FINAL SEAL COAT FOR TILE SHOWER PANS

A. The need of a Mira-Seal application to permanently seal leaking tile shower pans or tile flooring, will be determined prior to the bid process.

1. Apply using a roller after repairs and bonding agent is applied.
2. Allow Mira-Seal to cure for 24-hours.
3. Apply two or more coats of appropriately tinted epoxy primer to the bonded surface.
4. Apply two or more coats of Natural Accents to the primed surface.
5. Apply two to three coats of clear acrylic to protect the cured Natural Accents surface.
6. Remove masking paper and clean job site. Return to service in 24-hours.

3.6 POLYASPARTIC COATINGS

A. A two-part polyaspartic, very low VOC clear coat that can be used for indoor applications. It is available only in high gloss and is used as a clear coat over Natural Accents. It has excellent impact and wear resistance, and good chemical and stain resistance as well as low odor and rapid return to service capability.

1. Maintain all masking and ventilation in the project area used in the Natural Accents application process.
2. Natural Accents color coat must be completely dry.
3. Apply polyaspartic coating to room edges using a small roller and brush.
4. Apply polyaspartic coating with rollers starting at the far end of the floor working towards the exit. Provide enough manpower to stay ahead of Polyaspartic dry time to insure an even application. The polyaspartic coating will dry to the touch and be able to walk on in one to two hours.
5. Remove masking and clean job site. Return to service.
6. Polyaspartics have a fast dry time but total cure time is five days. It is recommended that heavy objects not be put back until the surface has completely cured.

3.7 ANTIMICROBIAL SEAL COATS

A. Coatings containing silver-ion infused additive can provide 24/7 protection for refinished floors, walls, showers as well as other restroom, kitchen and athletic facility surfaces that may be prone to bacterial growth. The silver-ion additive is dispersed and becomes an integral part of the coating. When bacteria come in contact with the protected surface, the silver-ions prevent them from growing, producing energy or replicating, therefore they die; inhibiting product degradation, discoloration or odors. Silver is a natural, inorganic and non-leaching product, which means that, unlike organic antimicrobial technologies, it stays within the coating and does not leach out. The controlled release of the active ingredient provides maximum antimicrobial protection for the lifetime of the coated surface, as long as it remains intact.

1. Silver is a natural antimicrobial and has been used to protect surfaces from several species of pathogenic bacteria, including Staphylococcus Aureus, Campylobacter, MRSA, E coli, Legionella, Listeria, Salmonella and others.
2. Silver-ion's antimicrobial effectiveness lasts a lifetime as long as the coating is intact.
3. The antimicrobial coating will not change the look, feel, smell or performance of the coating.

3.8 SAFETY

A. Contractor must conform to all safety guidelines and parameters required by architect or contractor and must provide Architect or Contractor MSDS sheets and a copy of its respiratory safety program upon request.
B. Technicians are required to wear all required personal protective equipment (gloves, safety goggles and use proper respirator equipment) as outlined by the manufacturer's Safety Manual during the refinishing process.
C. Technicians may be required to adhere to additional safety standards as required by the General Contractor.

3.9 ASBESTOS TILE AND GROUT CONTAINMENT

A. Surface refinishing does not disturb the original surface but covers the surface with multiple layers of epoxy and urethane coatings, creating a membrane to prevent the public from exposure to airborne fibers from asbestos tile or grout. While not technically an encapsulation, the process creates a highly effective sealant surrounding the tile and embedding into the grout. As it is unlikely in a shower environment that the tile or grout would ever become friable, surface refinishing provides an effective containment process.
B. Surface refinishing is not asbestos abatement or encapsulation. Owners requiring abatement or encapsulations should engage an environmental consulting firm and have the tile and/or grout tested to see if it contains more than 1 percent asbestos. Once examined, the consultant can determine if the refinishing process will provide the required encapsulation.

3.10 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
   1. Contractor shall touch up and restore coated surfaces damaged by testing.
   2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.11 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, 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 coated surfaces.
3.12 **INTERIOR HIGH-PERFORMANCE COATING SCHEDULE**

A. **Tile Substrates, Vertical Surfaces:**
   1. Miracle Method Epoxy System with Mira Seal.

B. **Tile Substrates, Horizontal Surfaces:**
   1. Bathing Room Floor Wet Areas: Miracle Method Epoxy System with Mira Seal and Antimicrobial seal coat.
   2. Tile Shower Pans: Miracle Method Epoxy System with Mira Seal and Antimicrobial seal coat.

END OF SECTION
SECTION 26 51 19 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following types of LED luminaires:
   1. Recessed, linear.
   2. Surface mount, linear.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.
B. CRI: Color Rendering Index.
C. Fixture: See "Luminaire."
D. IP: International Protection or Ingress Protection Rating.
E. LED: Light-emitting diode.
F. Lumen: Measured output of lamp and luminaire, or both.
G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Arrange in order of luminaire designation.
   2. Include data on features, accessories, and finishes.
   3. Include physical description and dimensions of luminaires.
   4. Include emergency lighting units, including batteries and chargers.
   5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
   6. Photometric data and adjustment factors based on laboratory tests, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project.
      a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
      b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

B. Shop Drawings: For nonstandard or custom luminaires.
   1. Include plans, elevations, sections, and mounting and attachment details.
   2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.
1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.
B. Product Certificates: For each type of luminaire.
C. Product Test Reports: For each type of luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.
D. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
   1. Provide a list of all lamp types used on Project; use ANSI and manufacturers’ codes.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.
B. Provide luminaires from a single manufacturer for each luminaire type.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Ambient Temperature: 41 to 104 degrees F.
   1. Relative Humidity: Zero to 95 percent.
B. Altitude: Sea level to 4000 feet.

2.2 RECESSED, LINEAR (RL-1 & RL-1E)

A. Manufacturers: Subject to compliance with requirements, Basis of Design fixture is Click Shallow Plenum System (CLKLED-750-80-35-SO-4-W-UNV-D-1-AC), or equal. Recessed linear fixture cannot be deeper than 1 3/4 inches due to existing fire line conflict. Acceptable manufacturers include:
   1. Axis Lighting, Inc. (Click Shallow Plenum System)
   2. Focal Point LLC.
   3. Lithonia Lighting; Acuity Brands Lighting, Inc.
B. Nominal Operating Voltage: 120 V ac.; confirm existing power service prior to ordering.
C. Lamp:
   1. Minimum 750 lm.
   2. Dimmable from 100 percent to 0 percent of maximum light output.
   3. Internal driver.
D. Housings:
   1. Extruded-aluminum housing and heat sink.
   2. White powder-coat finish.
   3. With integral mounting provisions.
E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
F. Diffusers and Globes:
   1. Acrylic (Spotless Frosted Lens).
   2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
   3. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.
G. Standards:
   1. ENERGY STAR certified.
   2. RoHS compliant.
   3. UL Listing: Listed for damp location.
   4. NEMA LE 4.
   5. Provide integral battery pack option for RL-1E designated fixtures.

2.3 SURFACE MOUNT, LINEAR (SM-2E)

A. Manufacturers: Subject to compliance with requirements, Basis of Design fixture is Click (B2SQSLED-1000-80-35-SO-4-W-UNV-D-1-B#), or equal. Acceptable manufacturers include:
   1. Axis Lighting, Inc.
   2. Finelite.
   3. Focal Point LLC.
   4. Lithonia Lighting; Acuity Brands Lighting, Inc.
   5. Specialty Lighting Industries, Inc.
B. Nominal Operating Voltage: 120 V ac., confirm existing power service prior to ordering.
C. Lamp:
   1. Minimum 750 lm.
   2. Minimum allowable efficacy of 80 lm/W.
   3. CRI of 80. CCT of 3000 K.
   4. Rated lamp life of 50,000 hours to L70.
   5. Dimmable from 100 percent to 0 percent of maximum light output.
   6. Internal driver.
   7. User-Replaceable Lamps:
      a. Bulb shape complying with ANSI C78.79.
      b. Lamp base complying with ANSI C81.61 or IEC 60061-1.
   8. Provide integral battery pack option.
   9. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.
D. Housings:
   1. Extruded-aluminum housing and heat sink.
   2. White powder-coat finish.
   3. With integral mounting provisions.
E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

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 roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

A. Comply with NECA 1.
B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
C. Install lamps in each luminaire.
D. Supports:
   1. Sized and rated for luminaire weight.
   2. Able to maintain luminaire position after cleaning and relamping.
   3. Provide support for luminaire without causing deflection of ceiling or wall.
   4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
E. Surface Ceiling-Mounted Luminaires:
   1. Secured to outlet box.
   2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
   3. Trim ring flush with finished surface.
F. Surface Wall-Mounted Luminaires:
   1. Attached to structural members in walls .
   2. Do not attach luminaires directly to gypsum board backer only.
G. Suspended Luminaires:
   1. Ceiling Mount:
      a. Minimum Two 5/32-inch- diameter aircraft cable supports per fixture. Utilize existing tie cables where feasible and add new a added fixture locationsadjustable to 10 feet.
      b. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.

4. Do not use ceiling grid as support for luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:
1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

I. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification of the Owner.

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
   1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
   2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
   1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
   2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
   3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION