PROJECT MANUAL

For

IDAHO TRANSPORTATION DEPARTMENT
DISTRICT 3
SHOP RENOVATION
Exterior Restoration

5800 North Coffey Street
Garden City, ID
83714

ITD Project No. 18-305

Project No. 18059.000

May 2, 2018

CONSTRUCTION SET
SECTION 000101 - PROJECT TITLE PAGE

PROJECT MANUAL
FOR
ITD (18-305) D3 SHOP RENOVATION
PROJECT NUMBER: 18059.000
STATE OF IDAHO - IDAHO TRANSPORTATION DEPARTMENT
5800 N. COFFEE STREET
GARDEN CITY, ID 83714
PREPARED BY:
CSHQA

END OF SECTION 000101
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Identification of project team members and their contact information.

1.02 OWNER:
   A. Name: State of Idaho - Idaho Transportation Department.
      1. Address Line 1: 8150 W. Chinden Boulevard.
      2. City: Garden City.
      3. State: ID.
   B. Primary Contact: All correspondence from the Contractor to the Architect will be through this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
      1. Title: Construction Manager.

1.03 CONSULTANTS:
   A. Architect: Design Professional of Record. All correspondence from the Contractor regarding construction documents authored by Architect's consultants will be through this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
      1. Company Name: CSHQA.
         a. Address Line 1: 200 Broad St.
         b. City: Boise.
         c. State: ID.
         e. Telephone: (208) 343-4635.
      2. Primary Contact:
         a. Title: Project Manager.
         b. Name: Loren Broyles.
         c. Email: loren.broyles@csenha.com.
   B. Mechanical Engineering Consultant - Plumbing:
      1. Company Name: CSHQA.
         a. Address Line 1: 200 Broad St.
         b. City: Boise.
         c. State: ID.
         e. Telephone: (208) 3443-4635.
   C. Mechanical Engineering Consultant - HVAC:
      1. Company Name: CSHQA.
         a. Address Line 1: 200 Broad St.
         b. City: Boise.
         c. State: ID.
         e. Telephone: (208) 343-4635.
   D. Electrical Engineering Consultant:
      1. Company Name: CSHQA.
         a. Address Line 1: 200 Broad St.
         b. City: Boise.
         c. State: ID.
         e. Telephone: (208) 343-4635.
1.04 CONSTRUCTION MANAGER:

A. Company Name: Petra, Inc.
   1. Address Line 1: 1097 N. Rosario Street.
   3. City: Meridian.
   4. State: ID.
   6. Telephone: (208) 323-4500.

B. Primary Contact:
   1. Title: Roy Jackson.
   2. Name: Construction Manager.
   3. Email: rjackson@petrainc.net.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION 000103
ARCHITECT: Craig A. Slocum, AIA
CSHQA, a professional association
200 Broad Street
Boise, Idaho 83702
(208) 343-4635, phone
(208) 343-1858, fax
craig.slocum@cshqa.com
www.cshqa.com

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CSHQA, a professional association
200 Broad Street
Boise, Idaho 83702
(208) 343-4635, phone
(208) 343-1858, fax
Russell.pratt@cshqa.com
www.cshqa.com

MECHANICAL ENGINEER: Russell C. Pratt, P.E.
CSHQA, a professional association
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Boise, Idaho 83702
(208) 343-4635, phone
(208) 343-1858, fax
Russell.pratt@cshqa.com
www.cshqa.com
## SECTION 000110 - TABLE OF CONTENTS

### PROCUREMENT AND CONTRACTING REQUIREMENTS

#### 1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>000101 - Project Title Page</td>
</tr>
<tr>
<td>B</td>
<td>000103 - Project Directory</td>
</tr>
<tr>
<td>C</td>
<td>000107 - Seals Page</td>
</tr>
<tr>
<td>D</td>
<td>000110 - Table of Contents</td>
</tr>
<tr>
<td>E</td>
<td>000115 - List of Drawing Sheets</td>
</tr>
<tr>
<td>F</td>
<td>001113 - Advertisement for Bids</td>
</tr>
<tr>
<td>G</td>
<td>002113 - Instructions to Bidders</td>
</tr>
<tr>
<td>H</td>
<td>002114 - Supplementary Instructions to Bidders</td>
</tr>
<tr>
<td>I</td>
<td>004100 - Bid Proposal</td>
</tr>
<tr>
<td>J</td>
<td>004101 - Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace</td>
</tr>
<tr>
<td>K</td>
<td>004102 - Bidder's Acknowledgement Statement</td>
</tr>
<tr>
<td>L</td>
<td>004328 - Tax Rebate Form</td>
</tr>
<tr>
<td>M</td>
<td>005000 - Contracting Forms and Supplements</td>
</tr>
<tr>
<td>N</td>
<td>005200 - Agreement Form</td>
</tr>
<tr>
<td>O</td>
<td>006100 - Contractor's Affidavit Concerning Taxes</td>
</tr>
<tr>
<td>P</td>
<td>007200 - General Conditions</td>
</tr>
<tr>
<td>Q</td>
<td>007300 - Supplementary Conditions</td>
</tr>
</tbody>
</table>

### SPECIFICATIONS

#### 2.01 DIVISION 01 -- GENERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>011000 - Summary</td>
</tr>
<tr>
<td>B</td>
<td>012000 - Price and Payment Procedures</td>
</tr>
<tr>
<td>C</td>
<td>012500 - Substitution Procedures</td>
</tr>
<tr>
<td>D</td>
<td>013000 - Administrative Requirements</td>
</tr>
<tr>
<td>E</td>
<td>014000 - Quality Requirements</td>
</tr>
<tr>
<td>F</td>
<td>014216 - Definitions</td>
</tr>
<tr>
<td>G</td>
<td>015000 - Temporary Facilities and Controls</td>
</tr>
<tr>
<td>H</td>
<td>016000 - Product Requirements</td>
</tr>
<tr>
<td>I</td>
<td>016116 - Volatile Organic Compound (VOC) Content Restrictions</td>
</tr>
<tr>
<td>J</td>
<td>017000 - Execution and Closeout Requirements</td>
</tr>
<tr>
<td>K</td>
<td>017419 - Construction Waste Management and Disposal</td>
</tr>
<tr>
<td>L</td>
<td>017800 - Closeout Submittals</td>
</tr>
<tr>
<td>M</td>
<td>017900 - Demonstration and Training</td>
</tr>
</tbody>
</table>

#### 2.02 DIVISION 02 -- EXISTING CONDITIONS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>024100 - Demolition</td>
</tr>
</tbody>
</table>

#### 2.03 DIVISION 03 -- CONCRETE

#### 2.04 DIVISION 04 -- MASONRY (NOT USED)

#### 2.05 DIVISION 05 -- METALS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>055000 - Metal Fabrications</td>
</tr>
</tbody>
</table>
B. 055213 - Pipe and Tube Railings

2.06 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES
   A. 061000 - Rough Carpentry
   B. 062000 - Finish Carpentry
   C. 064100 - Architectural Wood Casework

2.07 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION
   A. 072100 - Thermal Insulation
   B. 075100 - Built-Up Bituminous Roofing
   C. 076200 - Sheet Metal Flashing and Trim
   D. 077200 - Roof Accessories
   E. 079200 - Joint Sealants

2.08 DIVISION 08 -- OPENINGS
   A. 081113 - Hollow Metal Doors and Frames
   B. 081416 - Flush Wood Doors
   C. 083323 - Overhead Coiling Doors
   D. 083613 - Sectional Doors
   E. 084227 - Frameless Sliding Glass Doors
   F. 084313 - Aluminum-Framed Storefronts
   G. 084500 - Translucent Wall and Roof Assemblies
   H. 087100 - Door Hardware
   I. 088000 - Glazing
   J. 088300 - Mirrors

2.09 DIVISION 09 -- FINISHES
   A. 092116 - Gypsum Board Assemblies
   B. 092216 - Non-Structural Metal Framing
   C. 095100 - Acoustical Ceilings
   D. 099113 - Exterior Painting
   E. 099123 - Interior Painting

2.10 DIVISION 10 -- SPECIALTIES
   A. 102600 - Wall and Door Protection
   B. 102800 - Toilet, Bath, and Laundry Accessories

2.11 DIVISION 22 -- PLUMBING
   A. 220513 - Common Motor Requirements for Plumbing Equipment
   B. 220516 - Expansion Fittings and Loops for Plumbing Piping
   C. 220517 - Sleeves and Sleeve Seals for Plumbing Piping
   D. 220519 - Meters and Gages for Plumbing Piping
   E. 220523 - General-Duty Valves for Plumbing Piping
   F. 220548 - Vibration and Seismic Controls for Plumbing Piping and Equipment
   G. 220553 - Identification for Plumbing Piping and Equipment
   H. 220719 - Plumbing Piping Insulation
   I. 221005 - Plumbing Piping
<table>
<thead>
<tr>
<th>Division 22</th>
<th>Plumbing Piping Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 23</td>
<td>Heating, Ventilating, and Air-Conditioning (HVAC)</td>
</tr>
<tr>
<td>Division 26</td>
<td>Electrical</td>
</tr>
</tbody>
</table>

### DIVISION 22 - PLUMBING

#### Plumbing Piping Specialties

- 221006 - Plumbing Piping Specialties
- 221500 - General-Service Compressed-Air Systems
- 223000 - Plumbing Equipment
- 224000 - Plumbing Fixtures

### DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

#### Common Motor Requirements for HVAC Equipment
- 230513

#### Vibration and Seismic Controls for HVAC Piping and Equipment
- 230548

#### Identification for HVAC Piping and Equipment
- 230553

#### Testing, Adjusting, and Balancing for HVAC
- 230593

#### Duct Insulation
- 230713

#### HVAC Ducts and Casings
- 233100

#### Air Duct Accessories
- 233300

#### Axial HVAC Fans
- 233413

#### Centrifugal HVAC Fans
- 233416

#### HVAC Power Ventilators
- 233423

#### Engine Exhaust Systems
- 233516

#### Air Outlets and Inlets
- 233700

#### Breechings, Chimneys, and Stacks
- 235100

#### Furnaces
- 235400

#### Gas-Fired Radiant Heaters
- 235523

#### Fuel-Fired Unit Heaters
- 235533

#### Direct Gas-Fired Industrial Heating and Ventilating Units
- 237339

#### Packaged Outdoor Central-Station Air-Handling Units
- 237413

### DIVISION 26 - ELECTRICAL

#### Selective Demolition for Electrical
- 260505

#### Low-Voltage Electrical Power Conductors and Cables
- 260519

#### Grounding and Bonding for Electrical Systems
- 260526

#### Hangers and Supports for Electrical Systems
- 260529

#### Conduit for Electrical Systems
- 260533.13

#### Boxes for Electrical Systems
- 260533.16

#### Wiring Devices
- 260553

#### Wiring Connections
- 260583

#### Enclosed Contactors
- 260919

#### Lighting Control Devices
- 260923

#### Low-Voltage Electrical Service Entrance
- 262100

#### Switchboards
- 262413

#### Panelboards
- 262416

#### Wiring Devices
- 262726

#### Fuses
- 262813

#### Interior Lighting
- 265100

#### Exterior Lighting
- 265600
SECTION 000115
LIST OF DRAWING SHEETS

1.01 GENERAL
A. G01 – TITLE SHEET

1.02 ARCHITECTURAL
A. A13 – DEMOLITION PLAN
B. A21A – MAIN FLOOR PLAN – AREA ‘A’
C. A21B – MAIN FLOOR PLAN – AREA ‘B’
D. A22 – SECOND FLOOR PLAN
E. A23 – ROOF PLAN
F. A31 – REFLECTED CEILING PLAN
G. A51 – EXTERIOR ELEVATIONS
H. A71 – DETAILS
I. A82 – DOOR AND WINDOW SCHEDULES

1.03 STRUCTURAL
A. S0.01 – STRUCTURAL COVER SHEET
B. S0.02 – GENERAL NOTES
C. S1.01 – FOUNDATION PLAN
D. S1.02 – FRAMING PLAN
E. S5.01 – CONCREET AND MASONRY DETAILS (GENERAL)
F. S6.01 – DETAILS

1.04 PLUMBING
A. P01 – PLUMBING COVER SHEET
B. P11A – PLUMBING DEMOLITION PLAN AREA ‘A’
C. P11B – PLUMBING DEMOLITION PLAN AREA ‘B’
D. P21A – WASTE AND VENT PLAN AREA ‘A’
E. P21B – WASTE AND VENT PLAN AREA ‘B’
F. P22 – SECOND FLOOR PLUMBING PLAN
G. P23A – COMPRESSED AIR PLAN AREA ‘A’
H. P23B – COMPRESSED AIR PLAN AREA ‘B’
I. P24 – PLUMBING ROOF PLAN
J. P41 – PLUMBING SCHEDULES
K. P51 – PLUMBING DETAILS

1.05 MECHANICAL (HVAC)
A. M01 – HVAC COVER SHEET
B. M02 – ENERGY CODE COMPLIANCE
C. M11A – HVAC DEMOLITION PLAN AREA ‘A’
D. M11B – HVAC DEMOLITION PLAN AREA ‘B’
E. M12A – HVAC ROOF DEMOLITION PLAN AREA ‘A’
F. M12B – HVAC ROOF DEMOLITION PLAN AREA ‘B’
G. M21A – HVAC FLOOR PLAN AREA ‘A’
H. M21B – HVAC FLOOR PLAN AREA ‘B’
I. M22 – 2ND FLOOR HVAC PLAN
J. M23A – HVAC ROOF PLAN AREA ‘A’
K. M23B – HVAC ROOF PLAN AREA ‘B’
L. M60 – HVAC DETAILS
M. M70 – HVAC SCHEDULES
N. M71 – HVAC SCHEDULES
O. BM71 – HVAC CONTROL DIAGRAMS

1.06 ELECTRICAL
A. E01 – GENERAL SYMBOLS AND LEGEND
B. E02 – SCHEDULES AND COMPLIANCE FORMS
C. E03 – ELECTRICAL SITE PLAN
D. E04A – DEMOLITION PLAN GROUND FLOOR AREA ‘A’
E. E04B – DEMOLITION PLAN GROUND FLOOR AREA ‘B’
F. E05A – DEMOLITION PLAN ROOF AREA ‘A’
G. E05A – DEMOLITION PLAN ROOF AREA ‘A’
H. E11A – LIGHTING PLAN GROUND FLOOR AREA ‘A’
I. E11B – LIGHTING PLAN GROUND FLOOR AREA ‘B’
J. E12 – LIGHTING PLAN SECOND FLOOR
K. E11A – POWER PLAN GROUND FLOOR AREA ‘A’
L. E11B – POWER PLAN GROUND FLOOR AREA ‘B’
M. E22 – POWER PLAN SECOND FLOOR
N. E31A – MECHANICAL PLAN GROUND FLOOR AREA ‘A’
O. E31B – MECHANICAL PLAN GROUND FLOOR AREA ‘B’
P. E32 – MECHANICAL PLAN SECOND FLOOR
Q. E31A – MECHANICAL POWER ROOF PLAN AREA ‘A’
R. E31B – MECHANICAL POWER ROOF PLAN AREA ‘B’
S. E71 – DETAILS
T. E81 – SINGLE-LINE DIAGRAM
U. E82 – PANEL SCHEDULES
V. E83 – PANEL SCHEDULES

END OF SECTION 000115
ADVERTISEMENT FOR BIDS

ITD ADVERTISEMENT
DISTRICT #3 MAINTENANCE SHOP REPAIRS

LEGAL NOTICE ADVERTISEMENT FOR BID, Sealed proposals will be received by the Idaho Transportation Department, District 3 Headquarters Office, at 8150 Chinden Boulevard, Boise, Idaho 83714. The ITD (Idaho Transportation Department) is soliciting proposals for Hazardous Material Abatement and Selective Demolition, and for Construction Services for Repairs and Renovation Work on the existing District 3 Shop Building at 5800 North Coffey Street, Garden City, ID, 83714; ITD Project #18313.

Bid Package proposals for Bid Package #1 - Hazardous Material Abatement and Selective Demolition, will be received at District 3 Headquarters on Thursday, May 24th, 2018 at 2:00 PM Mountain Time. Bid Package Proposals 2, 3, 4, 5, 6, & 7 for all other trade work will be received at District 3 Headquarters on Thursday, May 31st, 2018. These proposals will be received in staggered 30 minute intervals. Refer to the Bid Opening Schedule at the end of this section for times set for each individual Bid Package opening.

A Pre-Bid Conference will be held at the District 3 Headquarters Site at 2:00 PM on May 16th, 2018 to address all Bid Packages 1 thru 7. Attendance is Encouraged. Required Bid Package/Bid Forms for the work are bound with the Project Manual.

Bidders are invited to attend a public bid opening where bids will be read aloud at the District 3 Office immediately following the closing time for receipt of bids. Owner reserves the right to reject any or all bids, or to waive informalities.

Bids must be accompanied by bid bond issued by an Idaho licensed surety company, or accompanied by a certified or cashier’s check from an Idaho Bank payable to the Owner in an amount not less than 5% of the total bid. This surety shall be forfeited by the Bidder should the Bidder fail to sign the contract or furnish the required 100% Performance and 100% Payment Bonds.

Bid Documents are available at for examination and may be obtained at the following locations: ITD’s website, http://itd.idaho.gov/business/ (click on the solicitations - ‘Non-Highway Projects tab); at the AGC Office in Boise, 1649 W. Shoreline Dr. Boise, ID 83702 (208) 344-2531 www.nwagcplanroom.com; ARC Documents Solutions, 2700 W. Idaho St. Boise, ID 83702 (208) 342-4141 www.nwcontractorsnetwork.com; Blueprint Specialties, 6205 W. Overland RD. Boise, ID (208) 377-0294 www.docuproject.com; also at the Offices of the Construction Manager, PETRA, Inc., 1097 N. Rosario St. #200, Meridian ID, 83642, (208) 323-4500.


ADVERTISEMETN

BOILR-2005 CM revised 02/27/17

(18-305)
(May, 2018)
## ITD DISTRICT 3 SHOP REPAIRS - BID OPENING SCHEDULE

<table>
<thead>
<tr>
<th>Bid Package #</th>
<th>Bid Package Description</th>
<th>Date for Opening</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hazardous Material &amp; Selective Demolition</td>
<td>May 24, 2018</td>
<td>2:00 PM</td>
</tr>
<tr>
<td>2</td>
<td>General Construction &amp; Door Assemblies</td>
<td>May 31, 2018</td>
<td>9:00 AM</td>
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<tr>
<td>3</td>
<td>Overhead Doors</td>
<td>May 31, 2018</td>
<td>9:30 AM</td>
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<tr>
<td>4</td>
<td>Storefront, Windows &amp; Translucent Panels</td>
<td>May 31, 2018</td>
<td>10:00 AM</td>
</tr>
<tr>
<td>5</td>
<td>Painting</td>
<td>May 31, 2018</td>
<td>10:30AM</td>
</tr>
<tr>
<td>6</td>
<td>Mechanical Systems</td>
<td>May 31, 2018</td>
<td>11:00 AM</td>
</tr>
<tr>
<td>7</td>
<td>Electrical Work</td>
<td>May 31, 2018</td>
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</tbody>
</table>
Instructions to Bidders

for the following PROJECT:
(Name and location or address)
ITD Garden City District 3 Shop Renovation
5800 North Coffey Street
Garden City, Idaho 83714

THE OWNER:
(Name, legal status and address)
State of Idaho Transportation Department
3311 West State Street
Boise, Idaho 83707

THE ARCHITECT:
(Name, legal status and address)
CSHQA, a professional association
200 Broad Street
Boise, Idaho 83702

TABLE OF ARTICLES

1 DEFINITIONS
2 BIDDER’S REPRESENTATIONS
3 BIDDING DOCUMENTS
4 BIDDING PROCEDURES
5 CONSIDERATION OF BIDS
6 POST-BID INFORMATION
7 PERFORMANCE BOND AND PAYMENT BOND
8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.
ARTICLE 1 DEFINITIONS
§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER’S REPRESENTATIONS
§ 2.1 The Bidder by making a Bid represents that:
§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder’s personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS
§ 3.1 COPIES
§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder’s deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.
§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect’s decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.
§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder’s refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent’s authority to bind the Bidder.

§ 4.2 BID SECURITY
§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS
§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder’s name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID
§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the
signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and
time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded
as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that
they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS
§ 5.1 OPENING OF BIDS
At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids
received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to
Bidders.

§ 5.2 REJECTION OF BIDS
The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other
data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)
§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been
submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available.
The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which,
in the Owner’s judgment, is in the Owner’s own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically
provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and
Alternates accepted.

ARTICLE 6 POST-BID INFORMATION
§ 6.1 CONTRACTOR’S QUALIFICATION STATEMENT
Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly
executed AIA Document A305, Contractor’s Qualification Statement, unless such a Statement has been previously
required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER’S FINANCIAL CAPABILITY
The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than
seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that
financial arrangements have been made to fulfill the Owner’s obligations under the Contract. Unless such reasonable
evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS
§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of
selection for the award of a Contract, furnish to the Owner through the Architect in writing:
   .1 a designation of the Work to be performed with the Bidder’s own forces;
   .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and
equipment proposed for the Work; and
   .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a
special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and
responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding
Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or
Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner
or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder’s option, (1)
withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder’s usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder’s usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.
Additions and Deletions Report for
AIA® Document A701™ – 1997

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added
to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original
AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part
of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by
AIA software at 12:51:16 on 05/08/2018.

PAGE 1

ITD Garden City District 3 Shop Renovation
5800 North Coffey Street
Garden City, Idaho 83714
...

(Name, legal status and address)
State of Idaho Transportation Department
3311 West State Street
Boise, Idaho 83707
...

(Name, legal status and address)
CSHQA, a professional association
200 Broad Street
Boise, Idaho 83702
Certification of Document’s Authenticity
AIA® Document D401™ – 2003

I., hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 12:51:16 on 05/08/2018 under Order No. 8664676036 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ – 1997, Instructions to Bidders, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

The following supplements modify, change, delete from or add to the Instructions to Bidders, AIA Document A701 – 1997. Where any Article of the Instructions to Bidders is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by the Supplementary Instructions to Bidders, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

ARTICLE 3 BIDDING DOCUMENTS

Add to or supplement Article 3, with the following:

3.2.1.1 Where Owner can reasonably establish that a bidder has knowledge of and failed to report a material error, inconsistency, or inaccuracy, Owner may find bidder non-responsive or unresponsible.

ARTICLE 4 BIDDING PROCEDURES

Add to or supplement Article 4, with the following:

4.1.1 A photocopy of the form bound in the Project Manual or a modified form included in an addendum is acceptable.

4.1.7 A corporate seal is not required if not required by the state of incorporation.

4.1.8 Bidder shall be a legal resident of the United States of America and shall only employ legal residents.

4.1.8.1 If the Bidder is a corporation, partnership, sole proprietorship or other legal entity, and employs individual persons, by submitting its bid, the Bidder warrants that it does not knowingly hire or engage any illegal aliens or persons not authorized to work in the United States; it takes steps to verify that it does not hire or engage any illegal aliens or persons not authorized to work in the United States; and that any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and shall be cause for the imposition of monetary penalties and/or termination of any contract resulting from this bid; or

4.1.8.2 If the Bidder is a natural person eighteen (18) years of age or older,

   a. by submitting its bid, Bidder warrants that its bid is subject to Idaho Code section 67-7903 [http://www3.state.id.us/cgi-bin/newidst?sctid=670790003.K] and, pursuant thereto, by submitting its bid, Bidder attests, under penalty of perjury, that it is a United States citizen or legal permanent resident or that it is otherwise lawfully present in the United States pursuant to federal law; and

   b. prior to being issued a contract, Bidder will be required to submit proof of lawful presence in the United States in accordance with Idaho Code section 67-7903.

4.1.9 Bids submitted must contain all original signatures in ink on all required forms, including the following:

   - Bid Proposal Form
   - Contractor’s Affidavit concerning Alcohol and Drug-Free Workplace
   - Bidder’s Acknowledgment Statement
   - Bid Bond (bid security)
4.2.1 Delete the last sentence.

4.2.1.1 To be considered, proposals must be accompanied by an acceptable security, in an amount not less than five (5) percent of the total amount of the bid including add alternates. The security may be in the form of a bond, or a certified or cashier's check.

4.2.1.2 A successful bidder who fails to sign the contract for the work or furnish the required bonds within 10 days following the receipt of notice of intent to award a contract, shall forfeit the security. The owner may then award the contract to the next lowest bidder.

4.2.2 A standard surety bid bond form meeting all the conditions of AIA Document A310 is acceptable.

4.2.3.1 The specified time for retainage of the bid security is 45 days after the opening of bids, so long as the bidder has not been notified of the acceptance of the bid.

4.3.1.1 The mailing envelope containing the bid shall be addressed as follows:

Idaho Transportation Department
P. O. Box 83720
Boise, Idaho 83720-0072

4.3.5 Along with his bid the bidder shall submit an affidavit certifying his compliance with Idaho Code, Title 72, Chapter 17, requiring the contractor and his subcontractors at the time of bid to provide a drug-free workplace program and to maintain such program throughout the duration of the contract.

4.3.6 Along with his bid the bidder shall submit an executed copy of the Bidder’s Acknowledgement Statement provided herein.

ARTICLE 5 CONSIDERATION OF BIDS

Add to Article 5, the following:

5.4 PUBLIC WORKS CONTRACTORS LICENSE

5.4.1 This Public Works project is not financed in whole or in part by Federal Aid Funds. Bid Proposals will be accepted from those contractors only (prime contractors, subcontractors, and/or specialty contractors) who, prior to the bid opening, hold current licenses as public works contractors in the State of Idaho.

5.5 EMPLOYMENT PRACTICES

5.5.1 Bids shall be based on the provisions of Section 44-1001 and 44-1002 of the Idaho Code dealing with labor preference.

5.6 NAMING OF SUBCONTRACTORS

5.6.1 Section 67-2310, Idaho Code, requires general (prime) contractors to include in their bid the name of the subcontractors who shall, in the event the contractor secures the contract, subcontract the plumbing, HVAC, and electrical work under the general (prime) contract. Failure to name subcontractors, as required, shall render any bid submitted by a general (prime) contractor unresponsive and void. Subcontractors named in accordance with the provisions of this section must possess an appropriate license or certificate of
competency issued by the State of Idaho covering the contractor work classification in which the subcontractor is named.

The Idaho Transportation Department requires the bidder to complete Bid Proposal Page 2 in its entirety for all categories of work listed. The Idaho Transportation Department also requires that the general (prime) contractor name the entity that will perform the work, including if the entity is a subcontractor, a sub-subcontractor or the general (prime) contractor submitting the bid. Failure to complete Bid Proposal, Page 2 in full shall render a bid unresponsive and void.

With regard to possessing an appropriate license or certificate of competency all subcontractors listed by the general (prime) contractor must have at the time of the bid opening a current license in the appropriate category (class, type and specialty category) as issued by the Public Works Contractors State License Board. In addition, plumbing, HVAC and electrical subcontractors shall have at the time of the bid opening a valid plumbing contractor’s license, HVAC contractor’s license or electrical contractor’s license, respectively, as issued by the Idaho Division of Building Safety.

In determining if the above listed subcontractors are required on the project, the Idaho Transportation Department will refer to the plans and specifications. If doubt exists prior to bid closing, potential bidders should contact the Idaho Transportation Department and the architect/engineer who prepared the plans and specifications will be requested to make the determination. If plumbing, HVAC, boiler, or electrical work is not shown on the plans and specifications, but is discovered by the bidder subsequent to the date of bid opening, then the bidder must request clarification from the architect/engineer. Absent such clarification, work will be considered incidental and naming of a subcontractor will not be required.

5.7 IDAHO DOMICILED CONTRACTORS

5.7.1 Section 67-2348, Idaho Code, requires the Idaho Transportation Department to apply a preference in determining which contractor submitted the lowest responsible bid. If the contractor who submitted the lowest dollar bid is domiciled in a state, which has preference law, which penalizes Idaho domiciled contractors then the Idaho Transportation Department must apply preference. The preference that will be applied is the preference law of the domiciliary state of the contractor who submitted the lowest dollar bid.

Generally speaking, a contractor's domiciliary state is the state in which the contractor's home office is located. If federal funds are involved in the project then no preference will be used.

5.8 WAGE RATES

5.8.1 Bids shall be based on applicable wage determinations and labor standards as established by the Secretary of Labor, United States Department of Labor. Refer to Federal wage determinations.

ARTICLE 6 POST BID INFORMATION

Delete paragraph 6.2

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

Modify and add to Article 7, the following:

In subparagraph 7.2.1, in the first sentence, delete “three days following the date of execution of the Contract" and substitute “ten days following the receipt of Notice of Intent to Award".
7.2.2.1 Performance bond and labor and material payment bond are required for this project; each in an amount of not less than 100% of the contract amount, and issued by a surety company authorized to do business in Idaho.

END OF SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
ITD District 3 Maintenance Shop Building Repairs

HAZARDOUS MATERIAL ABATEMENT & SELECTIVE DEMOLITION

BID PACKAGE #1

BID PACKAGE and BID PROPOSAL FORM

TO: State of Idaho
Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No.18313, District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within ___________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all Hazardous Material Abatement Work and Selective Demolition, including but not limited to:

Initial ______________________
Provide safety barricades and safe zones for and around all work.

Removal of all ACM’s (asbestos containing materials) and lead base paint applications indicated in the above referenced MTI report. All materials shall be removed and disposed of as required by current NESHAP and EPA regulations. Included is filing required EPA notifications and providing required documentations.

Included is the cutting and removal of sheetrock from the ceilings in the areas noted, Keynote #10 on plan sheet A10. Sheetrock will be **neat cut on center** of existing wood 2” x 12” joist. Joists are on 16” centers. Verify contamination of joint compound and dispose of sheetrock assemblies in a manner compliant with all regulations and laws have authority and jurisdiction.

The intent of Selective Demolition work for this Bid Package is to ‘generally’ include removal and disposal of items/structures that are associated with the hazardous material abatement requirements and include: Removal and disposal of all exterior metal framed windows and leaving clean openings prepared for new installations; removal of the elevated Shop Forman office completely including all concrete walls, stairs and floor slabs; concrete walls will be demolished minimum of 6” below adjacent concrete floors, all vertical surfaces will be left clean and free of any fins or protrusions; includes complete demolition of the Breakroom and Office walls in the Parts storage area and the door and walls at Grid 2; includes demolition work to remove the steel support frame work and mezzanine floor system and stairs in the west end of the building between Grids 1 & 2. The rooms in this end of the building are to be ‘gutted’ with the exception of the center wall at Grid C; every item to be removed is not going to be listed here however complete removal is expected; wood members, any miscellaneous items attached to walls and ceilings that get removed, any cabinetry, shelving, plywood on walls, etc. The mechanical equipment in the Parts Storage Area between Gridlines 1 & 2 will be cut and plugged under Bid Package 2, the electricity to any panels, lights devices or equipment will be cut and ‘safed-off’ under Bid Package #2. Once the Mechanical is plugged and the Electrical cut, all and any equipment, light, devices, etc., in this area between Grids 1 & 2 will be removed in this Bid Package.

**NOT INCLUDED IN THIS BID PACKAGE:**

- Demolition Work not include above.
- Demolition of any mechanical or electrical *unless noted otherwise* above.
- Cutting openings in the roof.
- Core drilling or saw-cutting through concrete and CMU walls and ceilings.
- Any new construction work.

Initial ______________________
GENERAL PROVISIONS:

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect, Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Initial _______________________
Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

**Plumbing (PWCLB Category 15400)**
(Name) __________________________
(Address) __________________________
Idaho Public Works Contractors License No. __________________________
Idaho Plumbing Contractors License No. __________________________

**Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)**
(Name) __________________________
(Address) __________________________
Idaho Public Works Contractors License No. __________________________
Idaho HVAC Contractors License No. __________________________

**Electrical (PWCLB Category 16000)**
(Name) __________________________
(Address) __________________________
Idaho Public Works Contractors License No. __________________________
Idaho Electrical Contractors License No. __________________________

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Initial __________________________
Respectfully submitted,

Acknowledge Addenda

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount

($  

The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. __________________________, and is domiciled in the State of __________________________.

Company Name:______________________________________________________________

Business Address:____________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this ________ day of_____________,2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier’s check), Contractor’s Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder’s Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial ________________
ITD District 3 Maintenance Shop Building Repairs

GENERAL CONSTRUCTION & DOOR ASSEMBLIES
BID PACKAGE #2

BID PACKAGE and BID PROPOSAL FORM

TO: State of Idaho
Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No.18313, District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within __________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all General Construction Work and Door Assemblies defined as follows, including but not limited to:

• General Requirements - Provide: safety barricades around work operations as necessary; temporary construction as may be required in the course of this work; hoisting, lifting and scaffolding as may be

Initial ____________________
required for this work; task lighting as may be require for this work; temporary toilets on site to be made available for all trades -allow for (1) portable unit for not less than 5 months with regular weekly service or as required; all tools, equipment, consumable supplies, and vehicles necessary for this work; electronic plan and specification documents will be provided - any costs associated with printed material is the responsibility of the Bidder; provide shop drawings and submittals as required; provide an OSHA approved first aid station during project duration for access by all trades; provide a 30 yard dumpster to the site for use by all trades for refuse that is not specifically noted in the other bid packages as the responsibility of those bidders to haul off; daily cleaning of your work area is to be broom clean. Work areas will be kept orderly and staged materials stacked out of traveled ways. Final cleaning is included for all these installations and immediate areas of this work.

- **General Demolition Work:** Includes demolition of swing door assemblies, all architectural improvements such as walls, ceiling materials, concrete, interior windows, saw cutting and removal of concrete and CMU walls, concrete stairs, hand railings, asphalt at exterior doors to create new transitions and stoops, chain link fencing removal, wood fascia damaged and in disrepair. **NOTE:** Carefully consider Bid Package 1 and the Scope of Demolition Work included there when bidding this Package. Do not hesitate to inquire for clarifications.

- **Temporary Enclosures for Openings:** As noted all of the building exterior windows will be removed in Bid Package #1. Included in this Bid Package is the construction and installation of temporary opening enclosures. Refer to the drawings.

- **Masonry Repair:** Repair damaged CMU at exterior SE corner of building; repair and/or patch back any masonry openings whether new or existing to accommodate new door or replaced door assemblies.

- **Concrete Work:** Provide new concrete stoops at exterior doorways; patch back concrete floor slab where existing elevated office is to be demolished in main shop area. Provide and install dowels.

- **Rough Carpentry:** Install blocking, nailers, backing and any door/window bucks as maybe required. Include all wood column, truss, beam and joist reinforcing and sister members per the Structural plans, extent is shown on Sheet S1.02 Framing Plan, framing new mechanical equipment penetration openings into ceiling. Refer to Mechanical drawings. Existing 2 x 12 ceiling joist are on 16” center spacing. Provide all lumber, framing hardware, fasteners, hoisting and lifting required. Provide required barricades and safe zones for this work.

- **Replace / or repair all damaged Downspouts as required:** Visually inspect all existing building downspouts and restore to new condition as required.

Initial ______________________
• **Roofing**: Cut and Patch for Mechanical & Electrical Work. MTI’s Hazardous Material Assessment Report included in these bid documents, be advised that the roofing material includes asbestos. Cutting and removal of roofing material is necessary for Mechanical and Electrical installations and is the responsibility of this contractor to address handling the roofing material in a manner consistent with all NESHAP, EPA and State and local code requirements. Engage a roofing subcontractor knowledgeable and experienced in this work. Roof patching at these locations is a part of this work. Layout for these new penetrations and openings is the responsibility of the Mechanical Contractor. Coordinate with the Mechanical Contractor.

• **Swing Door Assemblies**: Provide all labor and materials necessary to replace all door assemblies including frames, doors, and finish hardware as called out in the construction documents. Where existing frames are to remain, field verify the opening sizes to match new slabs back to opening for proper fit and closer. This bid package also includes the removal of all door openings to be replaced or retrofit.

• **Drywall**: Includes replacement of all sheet rock in the Shops Ceiling Areas where removed to allow for the installation of wood reinforcing members. Finish sheet rock to match adjacent texture, ready for paint.

• **Division 10 Specialties**: Furnish and install all bathroom accessories including mirrors.

• **It is the intent of this bid package** to pick up all of the work required to complete the project, as specified, that is not specifically called out in the other bid packages. Where it is reasonable that incidental work is required, it is deemed to be included.

**NOT INCLUDED IN THIS BID PACKAGE:**

• New Work and Demolition Work defined in Bid Packages 1, 3, 4, 5, 6, & 7 for this project. It is the responsibility of this Bidder to be familiar with the content of these Bid Packages and consider that content in the submission of this proposal. These Bid Packages are bound with the Project Documents. Any discrepancies noted or questions regarding content are to be brought to the attention of the Construction Manager prior to submission of this proposal.

• Saw cutting and/or core drilling of concrete and CMU for mechanical and electrical work, or steel reinforcing for the openings as depicted on Sheet S5.01.

• Job Site Trailer - Space will be provided for clerical activity.

**Initial ______________________**
• Temporary Fencing or barricade for the Site or building perimeter.
• Temporary power.
• Removal or replacement of owner’s equipment, storage shelving and racking, furniture, etc.
• No company advertising signs will be allowed on this project site.

GENERAL PROVISIONS:

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect, Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

Initial ______________________
BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

Plumbing (PWCLB Category 15400)
(Name) ____________________________
(Address) ____________________________
Idaho Public Works Contractors License No. ____________________________
Idaho Plumbing Contractors License No. ____________________________

Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)
(Name) ____________________________
(Address) ____________________________
Idaho Public Works Contractors License No. ____________________________
Idaho HVAC Contractors License No. ____________________________

Electrical (PWCLB Category 16000)
(Name) ____________________________
(Address) ____________________________
Idaho Public Works Contractors License No. ____________________________
Idaho Electrical Contractors License No. ____________________________

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Initial ____________________________
Respectfully submitted,

Acknowledge Addenda

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount

($


The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. __________________________, and is domiciled in the State of __________________________.

Company Name:____________________________________________________________

Business Address:____________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this ________ day of_____________,2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier's check), Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder's Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial _______________
ITD District 3 Maintenance Shop Building Repairs

OVERHEAD DOORS
BID PACKAGE #3

BID PACKAGE and BID PROPOSAL FORM

TO: State of Idaho
Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No. 18313, District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within __________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all Overhead Door Work, including but not limited to:

This work is inclusive of ALL existing Overhead Doors in this building. This work includes the removal existing, and replacement with all new, components required to make the doors operational including, springs, torsion bars, motors, controllers, addition of safety closing devices (currently non-existent), locks, and rollers and brackets. Clean and lubricate tracks to be reused. Clean hoist chains and reuse. Clean vision panels.

Initial ______________________
**NOT INCLUDED IN THIS BID PACKAGE:**

- Door replacement
- Vision Panel Replacement
- Painting
- Electrical Work

**GENERAL PROVISIONS:**

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. **Do not request clarifications from the Architect, Engineer or the Owner.** All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

**BASE PROPOSAL:**

Initial ______________________
Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

**Plumbing (PWCLB Category 15400)**
(Name) ____________________________________________________________
(Address) ________________________________
Idaho Public Works Contractors License No. _______________________________
Idaho Plumbing Contractors License No. _______________________________

**Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)**
(Name) ____________________________________________________________
(Address) ________________________________
Idaho Public Works Contractors License No. _______________________________
Idaho HVAC Contractors License No. _______________________________

**Electrical (PWCLB Category 16000)**
(Name) ____________________________________________________________
(Address) ________________________________
Idaho Public Works Contractors License No. _______________________________
Idaho Electrical Contractors License No. _______________________________

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/Air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation. Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Respectfully submitted,

Initial ___________________
Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount

($______________)

The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. ________________, and is domiciled in the State of ________________.

Company Name:______________________________________________________________

Business Address:____________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this ________ day of_____________, 2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier's check), Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder's Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial ______________________
ITD District 3 Maintenance Shop Building Repairs

STOREFRONT, WINDOWS & TRANSLUCENT PANELS
BID PACKAGE #4

BID PACKAGE and BID PROPOSAL FORM

TO: State of Idaho
Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No.18313, District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within ________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all Aluminum Windows, Storefront Doors and Translucent Panels, including but not limited to:

All Glass and glazing required for interior applications including door vision panels, and windows; aluminum window frames, exterior aluminum windows and aluminum storefront framing, aluminum storefront doors and ALL finish hardware required; all translucent panels as indicated and specified.

Initial ____________________
Included in this Bid Package is the removal of the temporary opening enclosures constructed and installed in Bid Package #2. This contractor shall disassemble and salvage all materials as practical - stack materials and turn over to owner.

Cleaning of all new installed windows, panels, glass and storefront, both sides, is a part of this work.

**NOT INCLUDED IN THIS BID PACKAGE:**

- Demolition Work (removal of existing windows and opening prep.) refer to Bid Package 1 for scope clarification.

**GENERAL PROVISIONS:**

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect,

Initial ____________________
Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding. The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

**Plumbing (PWCLB Category 15400)**
(Name) __________________________________________________________
(Address) _______________________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho Plumbing Contractors License No. __________________________

**Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)**
(Name) __________________________________________________________
(Address) _______________________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho HVAC Contractors License No. ______________________________

**Electrical (PWCLB Category 16000)**
(Name) __________________________________________________________
(Address) _______________________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho Electrical Contractors License No. ____________________________

Initial ______________________
FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.
Respectfully submitted,

Acknowledge Addenda

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount

($ )

The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. ________________, and is domiciled in the State of ________________.

Company Name:______________________________________________________________

Business Address:______________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this ______ day of__________,2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier's check), Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder's Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial ______________________
ITD District 3 Maintenance Shop Building Repairs

PAINTING
BID PACKAGE #5

BID PACKAGE and BID PROPOSAL FORM

TO: State of Idaho
   Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No.18313, District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within __________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all Painting Work, including but not limited to:

Interior painting of walls and ceiling as indicated on the drawings; hollow metal doors & frames; wood fascia, exposed metal such as railings and steel ladders where indicated. Paint entire building exterior including walls, doors, sills, soffits, fascia, and Overhead Doors. Prep surfaces according to specifications.

Initial ______________________
GENERAL PROVISIONS:

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect, Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.
BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding. The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

Plumbing (PWCLB Category 15400)
(Name) ________________________________________________
(Address) ____________________________________________
Idaho Public Works Contractors License No. __________________
Idaho Plumbing Contractors License No. _____________________

Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)
(Name) ________________________________________________
(Address) ____________________________________________
Idaho Public Works Contractors License No. __________________
Idaho HVAC Contractors License No. ________________________

Electrical (PWCLB Category 16000)
(Name) ________________________________________________
(Address) ____________________________________________
Idaho Public Works Contractors License No. __________________
Idaho Electrical Contractors License No. _____________________

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Initial ____________________
Respectfully submitted,

Acknowledge Addenda

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount

($______________)

The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. ________________________, and is domiciled in the State of ________________________.

Company Name:____________________________________________________________

Business Address:____________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this ______ day of_____________,2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier’s check), Contractor’s Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder’s Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial ______________________
TO: State of Idaho  
Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No.18313, District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within ________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all Mechanical Systems work, including but not limited to:

Refer to the Plans and Specifications for a complete summary of all required work and related control sequences that may not be listed in this summary.

Initial ______________________
Mechanical Demolition inside spaces

1. Demolition will include the removal of the gas fired boiler, and 2 duplex condensate pump/receivers. Remove all associated insulated black steel steam supply piping, and related uninsulated condensate piping.
2. Demolish all vertical throw steam heaters with traps and all related valves and accessories. This will include all shop and storage areas.
3. Demolish all wall mounted steam finned tube cabinets and exhaust fans in the office areas, restrooms, locker room, and lunch room. Demolition to include all traps, valves and accessories.
4. Demolish existing wall mounted air handler and all associated duct work and diffusers located on east office wall.
5. Demolish all steam horizontal throw unit heaters located in South first floor parts storage area. Demolition to include all traps, valves and accessories.
6. One suspended electric heater on the south wall to remain.
7. Demolish one York split system with remote outdoor ground mounted condenser. Demolish all related duct and registers associated with this unit.
8. Several small ceiling fans located in the Main shop areas will need to be demolished, see plans for location.
9. Demolish all PTAC’s and window air conditioners shown in the West Parts Storage area, Office areas, lunch room, and shop foreman office.

Mechanical Roof Demolition

1. Light Maintenance repair shop; demolish three general exhaust fans, and five vehicle exhaust fans.
2. Heavy maintenance repair shop; demolish two general exhaust fans and five vehicle exhaust fans.
3. Welding and machine shops; demolish three general exhaust fans. Two general exhaust fans located on the far east wall will remain.

New Mechanical systems

West Parts Storage Area

1. Scope of work for this area will include the installation of two general exhaust fans to provide ventilation for these spaces. The fan for each room will be electrically interlocked with a roof mounted Intake hood.
2. Heating will be supplied by two suspended gas fired unit heaters.
Light Maintenance Repair Shop

1. Scope of work for this area will include a roof mounted general exhaust fan to provide minimum ventilation rate for the space during occupied hours.
2. Maximum ventilation rate for the space will be controlled by column mounted CO sensor and will energize a large wall mounted exhaust fan located in the west high service bay wall. Fan exhaust shall be ducted down and under the light maintenance ceiling to within 12” from the floor.
3. Heating for the space will be provided by a Cambridge direct gas fired blow-thru space heater, suspended below the roof deck inside the space. Non-recirculating outside air will be ducted through a roof mounted intake hood furnished with the unit. Air will be discharged into the space with high velocity downturn plenum and directional elbows furnished with the unit.
4. Vehicle exhaust hoses and existing ducting will remain and be connected to new exhaust fans located on the roof. New wall mounted control switches are planned at each hose drop location to energize the fans as required.
5. Two large Propeller fans will be installed below the roof structure to provide additional ventilation and cooling. Installation needs to be coordinated with existing piping along the ceiling and vehicle lifts below.

Heavy Maintenance Repair Shop

1. General exhaust to provide minimum ventilation rate for this space will be provided by the same fan serving the light maintenance repair shop.
2. Maximum ventilation rate for the space will be controlled by column mounted CO sensor and will energize an additional large wall mounted exhaust fan located in the west high service bay wall. Fan exhaust shall be ducted down and under the light maintenance ceiling to within 12” from the floor.
3. Heating for the high bay space will be provided by a Cambridge direct gas fired blow-thru space heater, suspended below the roof deck and between the large beams. Non-recirculating outside air will be ducted through a roof mounted intake hood furnished with the unit. Air will be discharged into the space with high velocity downturn plenum and directional elbows furnished with the unit. Installation of this unit will need to be coordinated with existing lights and hoist crane that will operate below.
4. Vehicle exhaust reels and existing hoses will remain and be connected to new exhaust fans located on the roof. It is expected that the existing control whips located at each hose reel can be reused and connected to the energize the new fans.

5. Two large Propeller fans will be installed below the roof structure between the large beams to provide additional ventilation and cooling. Installation needs to be coordinated with existing lights and maintain manufacturer listed clearances.

Machine and Welding Shops

1. Scope of work for this area will include a roof mounted general exhaust fan to provide minimum ventilation rate for the space during occupied hours. The fan will be electrically interlocked with two roof mounted Intake hoods located in the welding shop area.

2. Maximum ventilation rate for the space will be controlled by wall mounted CO sensor and will energize a wall mounted exhaust fan located on the southeast machine shop wall. Fan exhaust shall be ducted down to within 12" from the floor. Coordination with overhead crane and duct will need to be considered.

3. Heating for the machine and welding shops will be provided by low intensity suspended radiant heaters. Heaters will receive combustion air from the space and vent with roof mounted flues. Heaters in the east machine and weld shops that have truck doors will be installed above the crane rails. Clearances from combustible construction will need to be verified. Field fabricated insulated heat shields will need to be constructed and attached to the top of the crane rails to protect the motor and wiring assembly if the crane is parked under the heaters. The straight heater installed in the large north machine shop will be suspended below the ceiling at a 0-degree angle. The straight heater installed in the large south welding shop will be suspended below the crane rail at a 45-degree angle. Clearance to combustibles such as electrical equipment, oil lines, and air compressor lines in these areas will need to be maintained.

4. Large Propeller fans will be installed below the roof structure to provide additional ventilation and cooling for all shop areas as shown. Installation needs to be coordinated with existing lights and maintain manufacturer listed clearances.

5. Welding exhaust arms will be installed on a wall or column where shown and will allow flexible welding smoke removal directly at the source. Ducts from these arms will be routed in clear space between the overhead crane rails to roof mounted exhaust fans. Installation height of
the arms will need to be coordinated with the Owners’ existing welding table heights and operational requirements.

West Offices, Restrooms, Locker and Lunch Room

1. Cooling and heating will be provided by a roof mounted 3-ton DX cooling/gas heating AC unit. Air will be ducted through the roof of the light maintenance repair shop down and under the windows inside the (E) Tools room. Exposed ducts will continue tight to the bottom of second floor structure through the restroom/locker room and lunch room. Coordinate the opening sizes required in the concrete walls for ductwork to pass through these rooms.

2. Exhaust for the restroom/locker room will be run in a similar manner to the AC ducts and follow a similar path.

East Offices, Restroom, Parts Storage, Electric Room, and Janitor

1. Cooling and heating will be provided by a roof mounted 5-ton DX cooling/gas heating AC unit. Air will be ducted through the roof of the light maintenance repair shop down and through the concrete wall under the second-floor structure. Exposed ducts will continue tight to the bottom of the second-floor structure and continue to the end of the southeast parts storage area. Coordinate the opening sizes required in the concrete walls for ductwork to pass through these rooms.

2. Exhaust for the restroom and janitor room will be run in a similar manner to the AC ducts and follow a similar path.

3. An electric wall heater will be surface mounted below the window of the small restroom located on the east wall.

4. An existing electric wall mounted unit heater located on the south wall of the parts storage area will remain to provide supplemental heat at the door opening.

Second floor file storage

1. Cooling and heating will be provided by a roof mounted 10-ton DX cooling/gas heating AC unit. Air will be ducted through the roof of the second-floor space and held tight to the ceiling.

Boiler Room

1. The existing Boiler room will be provided with two electric heaters. One to provide general space heating and a second to provide freeze protection for existing water piping located against the southwest wall.

Initial ______________________
NOTE:  All Concrete and CMU layout, saw cutting and core drilling necessary for the installations of these new Mechanical Systems is the responsibility of this contractor. Clean up from all saw cut and core drilling operations is included in this bid package. Further, it is the responsibility of this contractor to layout all areas on the roof to be cut and patched by the roofing contractor, whose work is included in Bid Package #2. Be advised that the roofing material, per MTI's report, contains asbestos.

NOT INCLUDED IN THIS BID PACKAGE:

- Asbestos Abatement
- Roof Cutting & Patching
- Rough Carpentry
- Painting
- Electrical Work

GENERAL PROVISIONS:

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager's staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

Initial ________________________
OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect, Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

**Plumbing (PWCLB Category 15400)**
(Name) _____________________________________________
(Address) ___________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho Plumbing Contractors License No. __________________________

**Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)**
(Name) _____________________________________________
(Address) ___________________________________________
Idaho Public Works Contractors License No. __________________________

Initial ______________________
Idaho HVAC Contractors License No. ____________________________

Electrical (PWCLB Category 16000)
(Name) ____________________________________________
(Address) __________________________________________

Idaho Public Works Contractors License No. ____________________________
Idaho Electrical Contractors License No. ____________________________

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Respectfully submitted,

Acknowledge Addenda ____________________________________________

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount ____________________________________________

($ ____________________ )
The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. __________________________, and is domiciled in the State of __________________________.

Company Name:______________________________________________________________

Business Address:______________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this ________ day of_____________,2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier’s check), Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder's Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial ______________________
ITD District 3 Maintenance Shop Building Repairs
ELECTRICAL WORK
BID PACKAGE #7

BID PACKAGE and BID PROPOSAL FORM

TO: State of Idaho
Division of Public Works

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No. #18313 District 3 Shop), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within ___________ consecutive calendar days thereafter.

SCOPE OF WORK:

Per drawing sheets indicated in the Sheet Index on the Title Sheet G.01, by CSHQA Architects dated 5/02/2018; the Project Manual by CSHQA Architects dated 5/02/2018, all addenda issued prior to the bid date, and the Hazardous Material Assessment Report by MTI dated 5/02/2018; original Wayland & Fennell drawings from 1953, (32 sheets) are included for your use as a reference, but not deemed to be considered as construction documents:

INCLUDED IN THIS BID PACKAGE:

Provide all labor, materials and equipment necessary for the completion of all Electrical Work, including but not limited to:

Electrical Work includes a new electrical service to be installed to the building and removal of the two existing services; new wiring through-out the building, some (electrical) demolition, new devices, equipment hook ups, switching and addition of code required lighting. More specifically:

Initial ______________________
Site Work:
- Trenching, backfill and asphalt patchback for new underground raceways for service utility. Provide and install all required underground conduits for secondary. Coordination with Idaho Power Company will be critical for new service requirements.
- Electrical service 1 of 2 is to be replaced. Existing 1300-amp, 240-volt, 3-phase system is to be demolished and replaced with a new 800-amp, 208Y/120-volt, 3-phase system. This includes a new ground mounted utility transformer.
- Demolish electrical service 2 of 2 at west end of building, including 2 panelboards to be returned to owner.
- Exterior service disconnect and feeder to be removed. Existing underground conduit to be abandoned.
- New exterior exit discharge lighting to be installed and connected.

Lighting:
- Existing lighting in selected areas to be demolished.
- Existing lighting branch circuits in work bays are routed through new contactor panels and toggle switches.
- Existing exterior lighting branch circuits are to be intercepted and routed through new photo cell on roof and contactor enclosure. A manual override switch to be provided.
- Installation of equipment ground conductor in existing lighting system branch circuits.
- Installation of new emergency egress lighting and exit signage.
- Installation of new high bay light fixtures and controls in storage rooms.

Power:
- New exterior electrical service disconnect to be installed.
- New main distribution panelboard to be installed and connected to new service.
- Select panelboards are to be replaced and existing loads to be reconnected to new panelboards and new breakers.
- Equipment ground conductor to be installed in all branch circuits.
- Intercept exiting equipment connections and reconnect.
- Installation and connection of mechanical contractor provided step-up transformer for 480-volt air compressor.

Mechanical Power:
- Select existing mechanical equipment to be disconnected from power service.
- New mechanical equipment to be furnish and installed by mechanical. Electrical to provide all disconnects where not provided by mechanical.

Initial _______________________
- Furnish and install conduit and conductors to new equipment. Coordination with mechanical is critical to verify connection requirements.
- Mechanical circuits to include equipment ground conductor in all branch circuits.

Demolition Work:

- Demolition work required of this bid package is included to the extent that it relates to electrical work. Further, all concrete and CMU layout, saw cutting and core drilling necessary for the installations of new Electrical Work is the responsibility of this contractor. Clean up from all saw cut and core drilling operations is included in this bid package.

**NOT INCLUDED IN THIS BID PACKAGE:**

- Asbestos Abatement
- Painting
- Mechanical Work

**GENERAL PROVISIONS:**

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Construction Manager’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.

Initial _______________________
OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect, Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

**Plumbing (PWCLB Category 15400)**
(Name)
(Address)
Idaho Public Works Contractors License No.
Idaho Plumbing Contractors License No.

Initial ______________________
Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)
(Name)________________________________________
(Address)______________________________________
Idaho Public Works Contractors License No._____________________
Idaho HVAC Contractors License No. __________________________

Electrical (PWCLB Category 16000)
(Name)________________________________________
(Address)______________________________________
Idaho Public Works Contractors License No. ____________________
Idaho Electrical Contractors License No. ________________________

FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Initial ______________________
Respectfully submitted,

Acknowledge Addenda

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount

($________________________)

The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. __________________________, and is domiciled in the State of __________________________.

Company Name:______________________________________________________________

Business Address:____________________________________________________________

By:__________________________________Title:____________________________

(Authorized Signature)

Dated this _______ day of____________, 2018

Phone:______________________ email:___________________ Fax: _______________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier’s check), Contractor's Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder's Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL

Initial _________________
CONTRACTOR’S AFFIDAVIT
CONCERNING ALCOHOL AND DRUG-FREE WORKPLACE

STATE OF __________________________
COUNTY OF _________________________

Pursuant to the Idaho Code, Section 72-1717, I, the undersigned, being duly sworn, deposite and certify that ________________________________ is in compliance with the provisions of Idaho Code section 72-1717; that ________________________________ provides a drug-free workplace program that complies with the provisions of Idaho Code, title 72, chapter 17 and will maintain such program throughout the life of a state construction contract and that ________________________________ shall subcontract work only to subcontractors meeting the requirements of Idaho Code, section 72-1717(1)(a).

____________________________________
Name of Contractor

____________________________________
Address

____________________________________
City and State

____________________________________
By: ________________________________
   (Signature)

Subscribed and sworn to before me this ________________ day of ________________, ______.

Commission expires:

____________________________________
NOTARY PUBLIC, residing at

____________________________________

____________________________________

FAILURE TO EXECUTE THIS AFFIDAVIT AND SUBMIT IT ALONG WITH YOUR BID SHALL MAKE YOUR BID NON-RESPONSIVE.
BIDDER’S ACKNOWLEDGEMENT STATEMENT

NOTE: THE INFORMATION CONTAINED HEREIN IS A SUMMARY OF VITAL CONTRACT PROVISIONS AND DOES NOT CHANGE THE CONTRACT DOCUMENTS THAT WILL GOVERN THIS PROJECT.

Idaho Transportation Department Project No. 17278.000

By submitting a bid for this project, the undersigned bidder agrees that, if awarded the contract for construction, Contractor will conform to all conditions and requirements of the contract, including but not limited to:

• Contractor agrees to comply with subparagraph 13.1.3 of the Supplementary Conditions pertaining to Sections 44-1001 and 44-1002, Idaho Code requiring the employment of 95% bona fide Idaho residents and providing for a preference in the employment of bona fide Idaho residents and regarding the employment of persons not authorized to work in the United States.

• Contractor will substantially complete the work within the time stated in the contract documents, or as modified by Change Order.

• If the Contractor fails to substantially complete the Project within the time stated in the contract documents, or as modified by Change Order, the Contractor agrees that the Owner may deduct from the contract amount liquidated damages in the amount per calendar day indicated in the Contract Documents times the number of calendar days until the project is Substantially Complete, as defined in the Contract Documents and as determined by the Architect (or Engineer).

• The Contractor agrees that the amount allowed for overhead and profit on any Change Order is limited to the amounts indicated in paragraph 7.3.10 of the General Conditions of the Contract for Construction, as supplemented, which are stated below.

1. for total changes of $10,000 or less in direct cost, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier combined shall not exceed twenty percent (20%) of direct costs.

2. for total changes exceeding $10,000 in direct cost, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier combined shall not exceed fifteen percent (15%) of direct costs.

3. the Contractor will determine the amount of overhead and profit to be apportioned between the Contractor and its subcontractor of allowable amounts of overhead, profit, bonds and insurance.

• The Contractor agrees that Change Orders are governed by the General Conditions of the Contract for Construction, as supplemented, including but not limited to Section 7.2.3 and Section 7.2.4 of the Supplementary Conditions:

BOILR-2005 CM revised 02/27/17

(18-305)
(May, 2018)
By the execution of a Change Order, the Contractor agrees and acknowledges that he has had sufficient time and opportunity to examine the change in work which is the subject of the Change Order and that he has undertaken all reasonable efforts to discover and disclose any concealed or unknown conditions which may to any extent affect the Contractor’s ability to perform in accordance with the Change Order. Aside from those matters specifically set forth in the Change Order, the Owner shall not be obligated to make any adjustments to either the Contract Sum or Contract Time by reason of any conditions affecting the change in work addressed by the Change Order that could have reasonably been discovered or disclosed by the Contractor’s examination.

Any Change Order fully executed by the Owner, Contractor and Architect (or Engineer), including but not limited to a Change Order arising by reason of the parties’ mutual agreement or by mediation, shall constitute a final and full settlement of all matters relating to or affected by the change in the Work, including but not limited to, all direct and consequential costs associated with such change and any and all adjustments to the Contract Sum and Contract Time. In the event a Change Order increases the Contract Sum, the Contractor shall include the work covered by such Change Order in the Application for Payment as if such work were originally part of the Project and Contract Documents.

FAILURE TO EXECUTE THIS ACKNOWLEDGEMENT WILL MAKE THE BID NONRESPONSIVE.

I, ________________________________, being duly authorized to bind the bidder ________________________________, does hereby certify that ________________________________, has fully read and understands this document and that it highlights certain parts of the contract that will be entered between the parties and that will govern this Project.

Signed: ___________________________________
Title: ____________________
Date: ____________

END OF BIDDER’S ACKNOWLEDGEMENT STATEMENT
REQUEST FOR TAX RELEASE

Date: _________________

RE: ITD Project Number: 17278.000

Project Name: ITD District 3 Shop Building Renovation
State Agency: Idaho Transportation Department
Project Location: 5800 N. Coffee Street, Garden City, ID 83714

Contractor Requesting Release – Name: __________________________________________
Address: ______________________________________________________________________
Contact Name: _________________________________________________________________
Telephone Number: ______________________________________________________________
Federal Employer Identification No.: _________________________________________________

Project Information:
Project is Complete: _____________________________________________________________
Project is Substantially Complete: _________________________________________________
Project Start Date: _______________________________________________________________
Project Complete Date: ____________________________________________________________
Final Contract Amount (including change orders): ____________________________________

Did any public works or other governmental agency supply materials, which were installed by this contractor or his subcontractors? Yes ______
No ______

If yes, list these materials and their dollar values: ____________________________________
To request a Tax Release, please send this form to:

Attn: Contract Desk; Sales Tax Audit; Idaho State Tax Commission; PO Box 36; Boise, ID 83722
SECTION 005000 - CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. See Section 007200 - General Conditions for the General Conditions.
B. See Section 007300 - Supplementary Conditions for the Supplementary Conditions.
C. The Agreement is based on AIA A132/CMa.
D. The General Conditions are based on AIA A232/CMa.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.
B. Bond Forms:
   1. Bid Bond Form: AIA A310.
   2. Performance and Payment Bond Form: AIA A312.
C. Post-Award Certificates and Other Forms:
      a. Supplemental Attachment: AIA G715
   2. Application for Payment Forms: AIA G732, AIA G736 and AIA G737 (for Construction Manager as Adviser to compile and summarize contractor’s application and certificate for payment).
D. Clarification and Modification Forms:
   2. Change Order Form (for Construction Manager as Adviser): AIA G701CMa.
E. Closeout Forms:

1.04 REFERENCE STANDARDS

A. AIA A132 - Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; 2009.
C. AIA A310 - Bid Bond; 2010.
D. AIA A312 - Performance Bond and Payment Bond; 2010.
J. AIA G736 - Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition; 2009.
K. AIA G737 - Summary of Contractors' Applications for Payment, Construction Manager as Adviser Edition; 2009.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION 005000
SECTION 005200 - AGREEMENT FORM

PART 1 GENERAL

1.01 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
   A. AIA Document A132/CMa, 2009 Edition, Standard Form of Agreement Between Owner and Contractor – Construction Manager-Adviser Edition will be used as the agreement for this project. Copies of AIA Document A132/CMa are available for review at the offices of the Owner, Architect, and Construction Manager. Copies of the document may be purchased from the American Institute of Architects or its local distributors.

1.02 RELATED REQUIREMENTS
   A. Section 007200 - General Conditions.
   B. Section 007300 - Supplementary Conditions.
   C. Section 014216 - Definitions.

1.03 MODIFICATIONS TO THE AGREEMENT FORM
   A. ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
      1. 3.1 The date of commencement will be fixed by issuance of a "Notice of Intent to Award" and a "Notice to Proceed". Delete the last sentence of paragraph 3.1.
      2. 3.2 Liquidated damages will be included as provided in the Supplementary Conditions.
   B. ARTICLE 5 PAYMENTS
      1. In paragraph 5.2, delete “as follows:” and replace with “a day agreed upon by the Owner and Contractor.”
      2. Delete paragraph 5.3 and substitute the following:
         3. 5.3 Provided that an application for payment is received by the Construction Manager on the established date, the Owner shall make payment to the Contractor not later than 21 days from receipt by the Owner of the certification by the Construction Manager.
      4. In subparagraphs 5.6.1 and 5.6.2 Retainage will be five percent (5%) for work completed and material suitably stored.
      5. In subparagraph 5.6.1, delete the last sentence. Delete subparagraphs 5.7.1, 5.7.2 and paragraph 5.8.
      6. No reduction in retainage will be allowed prior to final completion without written approval of the Owner. Refer to Supplementary Condition 9.6.1.1.
      7. Add new paragraph 5.9:
         8. 5.9 A condition will be included forbidding more retainage from a subcontractor or supplier than retained from their portion of the work.
   C. ARTICLE 7 MISCELLANEOUS PROVISIONS
      1. 7.2 Will be modified to agree with paragraph 13.6.1 of the Supplementary Conditions.
      2. 7.4.1 Contractor warrants that it does not knowingly hire or engage any illegal aliens or persons not authorized to work in the United States; it takes steps to verify that it does not hire or engage any illegal aliens or persons not authorized to work in the United States; and that any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and shall be cause for the imposition of monetary penalties not to exceed five percent (5%) of the total Contract Amount per violation and/or termination of this contract.
   D. ARTICLE 8 TERMINATION OR SUSPENSION
      1. Add to both paragraphs 8.1 and 8.2 “as modified by the Supplementary Conditions.”

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 005200
State of Idaho
Department of Administration
Division of Public Works

CONTRACTOR’S AFFIDAVIT CONCERNING TAXES

STATE OF IDAHO
COUNTY OF ADA

Pursuant to the Idaho Code, Title 63, Chapter 15, I, the undersigned, being duly sworn, deposite and certify that all taxes, excises and license fees due to the State or its taxing units, for which I or my property is liable then due or delinquent, has been paid, or arrangements have been made, before entering into a contract for construction of any public works in the State of Idaho.

________________________________
Name of Contractor

________________________________
Address

________________________________
City and State

By: ____________________________
(Signature)

Subscribed and sworn to before me this ___________________ day of _________________, ______ .

Commission expires: ____________________________

NOTARY PUBLIC, residing at

________________________________
________________________________
________________________________

CONTRACTOR’S AFFIDAVIT
BOILR-2005 CM revised 02/27/17

CA - 1
(18-305)
(May, 2018)
SECTION 007200 - GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS
1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.

RELATED REQUIREMENTS
2.01 SECTION 007300 - SUPPLEMENTARY CONDITIONS.
2.02 SECTION 014216 - DEFINITIONS.

SUPPLEMENTARY CONDITIONS
3.01 REFER TO DOCUMENT 007300 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

END OF SECTION 007200
for the following PROJECT:
(Name, and location or address)

ITD Garden City District 3 Shop Renovation
5800 North Coffey Street
Garden City, Idaho 83714

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

Petra, Inc.
1097 North Rosario
Meridian, Idaho 83642

THE OWNER:
(Name, legal status and address)

State of Idaho Transportation Department
3311 West State Street
Boise, Idaho 83707

THE ARCHITECT:
(Name, legal status and address)

CSHQA, a professional association
200 Broad Street
Boise, Idaho 83702

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form, An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2008, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.
<table>
<thead>
<tr>
<th></th>
<th>TABLE OF ARTICLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GENERAL PROVISIONS</td>
</tr>
<tr>
<td>2</td>
<td>OWNER</td>
</tr>
<tr>
<td>3</td>
<td>CONTRACTOR</td>
</tr>
<tr>
<td>4</td>
<td>ARCHITECT AND CONSTRUCTION MANAGER</td>
</tr>
<tr>
<td>5</td>
<td>SUBCONTRACTORS</td>
</tr>
<tr>
<td>6</td>
<td>CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS</td>
</tr>
<tr>
<td>7</td>
<td>CHANGES IN THE WORK</td>
</tr>
<tr>
<td>8</td>
<td>TIME</td>
</tr>
<tr>
<td>9</td>
<td>PAYMENTS AND COMPLETION</td>
</tr>
<tr>
<td>10</td>
<td>PROTECTION OF PERSONS AND PROPERTY</td>
</tr>
<tr>
<td>11</td>
<td>INSURANCE AND BONDS</td>
</tr>
<tr>
<td>12</td>
<td>UNCOVERING AND CORRECTION OF WORK</td>
</tr>
<tr>
<td>13</td>
<td>MISCELLANEOUS PROVISIONS</td>
</tr>
<tr>
<td>14</td>
<td>TERMINATION OR SUSPENSION OF THE CONTRACT</td>
</tr>
<tr>
<td>15</td>
<td>CLAIMS AND DISPUTES</td>
</tr>
</tbody>
</table>
INDEX
(Topics and numbers in bold are section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, 12.3
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

Access to Work
3.16, 6.2.1, 12.1

Accident Prevention
10
Acts and Omissions
3.2.1, 3.2.2, 3.3.2, 3.12.8, 3.18, 8.3.1, 9.5.1, 10.1, 10.2.5, 13.4.2, 13.7
Addenda
1.1.1, 3.11, 4.2.14
Additional Costs, Claims for
3.2.4, 3.7.4, 3.7.5, 6.1.1, 7.3, 9.10.3, 9.10.4, 10.3, 10.4, 15.1.4
Additional Inspections and Testing
4.2.8, 12.2.1, 13.5
Additional Insured
11.1.4
Additional Time, Claims for
3.7.4, 3.7.5, 6.1.1, 7.3, 8.3, 10.3

Administration of the Contract
3.10, 4.2
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.19
Allowances
3.8, 7.3.8
All-risk Insurance
11.3.1, 11.3.1.1

Applications for Payment
4.2.7, 4.2.15, 7.3.9, 9.2, 9.3, 9.4, 9.5.1, 9.7, 9.8.3, 9.10.1, 9.10.3, 9.10.5, 11.1.3, 14.2.4
Approvals
2.1.1, 2.2.2, 2.4, 3.1.4, 3.10.1, 3.10.2, 3.12.4 through 3.12.10, 3.13.2, 3.15.2, 4.2.9, 9.3.2, 13.4.2, 13.5

Arbitration
8.3.1, 11.3.10, 13.1, 15.3.2, 15.4

ARCHITECT
4
Architect, Certificates for Payment
9.4
Architect, Definition of
4.1.1
Architect, Extent of Authority
5.2, 7.1.2, 7.3.7, 7.4, 9.3.1, 9.4, 9.5, 9.8.3, 9.8.4, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.5.1, 15.1.3, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.8, 4.2.1, 4.2.2, 4.2.8, 4.2.13, 5.2.1, 9.6.4, 15.2
Architect’s Additional Services and Expenses
2.4, 11.3.1.1, 12.2.1, 12.2.4, 13.5.2
Architect’s Administration of the Contract
4.2, 9.4, 9.5, 15.2
Architect’s Approvals
3.12.8
Architect’s Authority to Reject Work
4.2.8, 12.1.2, 12.2.1
Architect’s Copyright
1.5
Architect’s Decisions
4.2.8, 7.3.9, 7.4, 8.1.3, 8.3.1, 9.2, 9.4, 9.5, 9.8.3, 9.9.2, 13.5.2, 14.2.2, 14.2.4, 15.2
Architect’s Inspections
3.7.4, 4.2, 9.8.3, 9.9.2, 9.10.1, 13.5
Architect’s Instructions
3.2.4, 7.4, 9.4
Architect’s Interpretations
4.2.8, 4.2.17, 4.2.18
Architect’s On-Site Observations
4.2.2, 9.4, 9.5.1, 9.10.1, 12.1.1, 12.1.2, 13.5
Architect’s Project Representative
4.2.16
Architect’s Relationship with Contractor
1.1.2, 1.5, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.9.2, 3.9.3, 3.10, 3.11, 3.12.8, 3.16, 3.18, 4.2, 5.2, 6.2.2, 8.2, 11.3.7, 12.1, 13.5
Architect’s Relationship with Construction Manager
1.1.2, 9.3 through 9.10, 10.3, 13.5.1, 10.3, 11.3.7, 13.4.2, 13.5.4
Architect’s Relationship with Subcontractors
1.1.2, 4.2.8, 5.3, 9.6.3, 9.6.4
Architect’s Representations
9.4, 9.5, 9.10.1
Architect’s Site Visits
4.2.2, 9.4, 9.5.1, 9.8.3, 9.9.2, 9.10.1, 13.5
Asbestos
10.3.1
Attorneys’ Fees
3.18.1, 9.10.2, 10.3.3
Award of Other Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1, 5.2.1, 11.4.1
Binding Dispute Resolution
9.7, 11.3.9, 11.3.10, 13.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.4.1
Boiler and Machinery Insurance
11.3.2

Bonds, Insurance and
11
Bonds, Lien
7.3.7.4, 9.10.3
Bonds, Performance and Payment
7.3.7.4, 9.6.7, 9.10.3, 11.3.9, 11.4
Building Permit
2.2.2, 3.7.1

Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5

Certificates for Payment
4.2.2, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 15.1.3
Certificates of Inspection, Testing or Approval
13.5.4
Certificates of Insurance
9.3.2, 9.10.2, 11.1.3

Change Orders
1.1.1, 2.4, 3.4.2, 3.7.4, 3.8.2, 3.11, 3.12.8, 4.2.12, 4.2.13, 4.2.14, 5.2.3, 7.1.1, 7.1.2, 7.2, 7.3.2, 7.3.4, 7.3.6, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.3.1.2, 11.3.4, 11.3.9, 12.1.2, 15.1.3
Change Orders, Definition of
7.2
Changes
7.1

Changes IN THE WORK
2.2.1, 3.4.2, 3.11, 3.12.8, 4.2.13, 4.2.14, 7, 8.3.1, 9.3.1.1
Claims, Definition of
15.1.1

Claims AND Disputes
1.1.8, 3.2.4, 3.7.5, 6.1.1, 7.3.9, 8.3.2, 9.3.3, 9.10.3, 9.10.4, 10.3.3, 15, 15.4
Claims for Additional Cost
3.2.4, 3.7.5, 6.1.1, 7.3.9, 9.10.3, 9.10.4, 10.3.2, 10.4, 15.1.4
Claims for Additional Time
3.2.4, 3.7.5, 7, 8.3.2, 10.4, 15.1.5
Concealed or Unknown Conditions, Claims for
3.7
Claims for Damages
3.2.4, 3.18, 6.1.1, 6.2.5, 8.3.2, 9.3.3, 9.5.1.2, 9.10.2, 9.10.5, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 15.1.6

Cleaning Up
3.15, 6.3
Commencement of Statutory Limitation Period
13.7
Commencement of the Work, Definition of
8.1.2
Communications, Owner to Architect
2.2.6

Communications, Owner to Construction Manager
2.2.6
Communications, Owner to Contractor
2.2.6
Communications Facilitating Contract Administration
3.9.1, 4.2.6

Completion, Payments and
9
Completion, Substantial
4.2.15, 8.1.1, 8.1.3, 8.2.3, 9.4.3.3, 9.8, 9.9.1, 9.10.3, 12.2.1, 12.2.2, 13.7
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
11.1.1
Consolidation or Joinder
15.4.4

Construction by Owner or by Other Contractors
11.4, 6
Construction Change Directive, Definition of
7.3.1

Construction Change Directives
1.1.1, 3.4.2, 3.12.8, 4.2.12, 4.2.13, 7.1.1, 7.1.2, 7.1.3, 7.3, 9.3.1.1
Construction Manager, Building Permits
2.2.2
Construction Manager, Communications through
4.2.6
Construction Manager, Construction Schedule
3.10.1, 3.10.3

Construction Manager
4
Construction Manager, Definition of
4.1.2
Construction Manager, Documents and Samples at the Site
3.11
Construction Manager, Extent of Authority
3.12.7, 3.12.8, 4.1.3, 4.2.1, 4.2.4, 4.2.5, 4.2.9, 7.1.2, 7.2, 7.3.1, 8.3, 9.3.1, 9.4.1, 9.4.2, 9.4.3, 9.8.2, 9.8.3, 9.8.4, 9.9.1, 12.1, 12.2.1, 14.2.2, 14.2.4
Construction Manager, Limitations of Authority and Responsibility
4.2.5, 4.2.8, 13.4.2
Construction Manager, Submittals
4.2.9
Construction Manager’s Additional Services and Expenses
12.2.1
Construction Manager’s Administration of the Contract
4.2, 9.4, 9.5
Construction Manager’s Approval
2.4, 3.10.1, 3.10.2
Construction Manager’s Authority to Reject Work
4.2.8, 12.2.1
Contract Time
3.7.4, 3.7.5, 4, 3.10.2, 5.2.3, 7.2.3, 7.3.1, 7.3.5, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 14.3.2, 15.1.5.1, 15.2.5
Contract Time, Definition of 8.1.1
CONTRACTOR
3
Contractor, Definition of 3.1.1
Contractor’s Construction Schedules 3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Contractor’s Employees
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1
Contractor’s Liability Insurance 11.1
Contractor’s Responsibility for Those Performing the Work 3.3.2, 3.18.5, 6.1.3, 6.2.9, 9.5.1, 10.2.8
Contractor’s Review of Contract Documents 3.2
Contractor’s Right to the Work 9.7
Contractor’s Right to Terminate the Contract 14.1
Contractor’s Submittals
3.10.2, 3.11, 3.12, 4.2.9, 9.2, 9.3, 9.8.2, 9.9.1, 9.10.2, 9.10.3, 11.1.3, 11.4.2
Contractor’s Superintendent
3.9, 10.2.6
Contractor’s Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 4.2.5, 4.2.7, 6.1, 6.2.4, 7.1.3, 7.3.5, 7.3.7, 8.2, 10, 12, 14, 15.1.3
Contractual Liability Insurance
11.1.1.8, 11.2, 11.3.1.5

Coordination and Correlation
1.2, 3.2, 3.3.1, 3.10, 3.12.6, 6.1.2, 6.2.1

Copies Furnished of Drawings and Specifications
1.5, 2.2.5, 3.11

Copyrights
1.5, 3.17

Correction of Work
2.3, 2.4, 9.4.1, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, 12.2

Correlation and Intent of the Contract Documents
1.2

Costs
2.4, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3,
7.3.3.3, 7.3.6, 7.3.7, 7.3.8, 7.3.9, 11.3.1.2, 11.3.1.3,
11.3.4, 11.3.9, 12.1, 12.2.1, 13.5, 14

Cutting and Patching
3.14, 6.2.5

Damage to Construction of Owner or Other Contractors
3.14.2, 6.2.4, 9.5.1.5, 10.2.1.2, 10.2.5, 10.4, 11.1.1,
11.3, 12.2.4

Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 11.3.1, 12.2.4

Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.2, 10.3.3, 11.1.1, 11.3.5, 11.3.7,
14.2.4, 15.1.6

Damages for Delay
6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 15.1.5

Date of Commencement of the Work, Definition of
8.1.2

Date of Substantial Completion, Definition of
8.1.3

Day, Definition of
8.1.4

Decisions of the Architect
3.7.4, 4.2.7, 4.2.8, 4.2.10, 4.2.11, 4.2.13, 4.2.15,
4.2.16, 4.2.17, 4.2.18, 4.2.19, 4.2.20, 7.3.9, 8.1.3,
8.3.1.1, 9.2, 9.4, 9.5, 9.8.3, 9.8.4, 9.9.1, 10.1.2, 13.5.2,
14.2.2, 14.2.4, 15.1, 15.2

Decisions of the Construction Manager
7.3.7, 7.3.8, 7.3.9, 15.1, 15.2

Decisions to Withhold Certification
9.4.1, 9.5, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance,
Rejection and Correction of
2.3, 2.4, 3.5, 4.2.8, 6.2.5, 9.5.1, 9.6.6, 9.8.2, 9.9.3,
9.10.4, 12.2.1, 12.2.2

Definitions
1.1, 2.1.1, 3.1.1.1, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 4.1.2,
7.2, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

Delays and Extensions of Time
3.2, 3.7.4, 5.2.3, 7.2, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2,
10.4, 14.3.2, 15.1.5, 15.2.5

Disputes
7.3.8, 7.3.9, 9.3, 15.1, 15.2

DISPUTES, CLAIMS AND
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 15, 15.4

Documents and Samples at the Site
3.11

Drawings, Definition of
1.1.5

Drawings and Specifications, Ownership and Use
1.1.1, 1.5, 2.2.5, 3.11, 5.3

Duty to Review Contract Documents and Field Conditions
3.2

Effective Date of Insurance
8.2.2, 11.1.2

Emergencies
10.4, 14.1.1.2, 15.1.4

Employees, Contractor’s
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.1, 3.18.2, 4.2.3, 4.2.6,
10.2, 10.3.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1

Equipment, Labor, Materials and or
1.1.3, 1.1.6, 3.4.5, 3.8.2, 3.8.3, 3.12.2, 3.12.3,
3.13.1, 3.15.1, 4.2.8, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2,
9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.2

Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3.1, 3.4.1, 3.5,
3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.5, 8.2,
9.5.1, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3.1, 15.1.3

Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.3, 7.4, 8.3, 9.5.1, 9.7, 10.3.2,
10.4, 14.3, 15.1.5, 15.2.5

Failure of Payment
9.5.1.3, 9.7, 13.6, 14.1.1.3, 14.1.3, 14.2.1.2, 15.1.4

Faulty Work (See Defective or Nonconforming Work)

Final Completion and Final Payment
4.2.1, 4.2.15, 9.8.2, 9.10, 11.1.2, 11.1.3, 11.3.1,
11.3.5, 12.3, 15.2.1

Financial Arrangements, Owner’s
2.2.1

GENERAL PROVISIONS
1

Governing Law
13.1

Guarantees (See Warranty and Warranties)

Hazardous Materials
10.2.4, 10.3

Identification of Contract Documents
1.2.1

Identification of Subcontractors and Suppliers
5.2.1

Indemnification
3.18, 9.10.2, 10.3.3, 10.3.5, 10.3.6, 11.3.12, 11.3.7

Information and Services Required of the Owner
2.1.2, 2.2, 4.2.6, 6.1.2, 6.2.5, 9.6.1, 9.6.4, 9.8, 9.9.1,
9.10.3, 10.3.2, 10.3.3, 11.2, 11.3.4, 13.5.1, 13.5.2,
14.1.1.4, 14.1.3, 15.1.2

Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Extent of Authority
14.2.2, 14.2.4, 15.1.3, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
3.18.1, 10.2.1, 10.2.2, 10.2.8, 10.3, 10.3.3, 10.4, 11.1.1
Inspections
3.1.3, 3.7.1, 4.2.2, 9.8.2, 9.9.2, 9.10.1, 13.5
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.1.4, 3.3.3, 3.7.1, 4.2.4, 5.2.1, 7, 8.2.2, 12.1, 13.5.2
Instruments of Service, Definition of
1.1.7, 1.5, 1.6
Insurance
6.1.1, 7.3.7, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, 11
Insurance, Boiler and Machinery
11.3.2
Insurance, Contractor’s Liability
11.1
Insurance, Effective Date of
8.2.2, 11.1.2
Insurance, Loss of Use
11.3.3
Insurance, Owner’s Liability
11.2
Insurance, Property
10.2.5, 11.3
Insurance, Stored Materials
9.3.2, 11.3.1
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1, 11.3.1.5
Insurance Companies, Settlement with
11.3.10
Intent of the Contract Documents
1.2, 4.2.18, 4.2.19, 7.4
Interest
9.7, 13.6
Interpretation
1.4, 4.2.8, 4.2.17, 4.2.18
Interpretations, Written
4.2.17, 4.2.18, 4.2.20
Joinder and Consolidation of Claims Required
15.4.4
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, 3.4, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.12.6, 3.12.10, 3.13.1, 3.15.1, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.6, 9.10.2, 10.2.1.2, 11.3.1, 14.2.1, 14.2.2
Labor Disputes
8.3.1
Laws and Regulations
3.2.3, 3.2.4, 3.7, 3.13.1, 10.2.2, 10.2.3, 13.5.1, 14.2.1
Liens
2.1.2, 9.3.3, 9.10.2, 9.10.4, 15.2.8
Limitation on Consolidation or Joinder
15.4.4
Limitations, Statutes of
15.4.1
Limitations of Authority
3.12.4, 4.1.3, 4.2.16
Limitations of Liability
9.6.7, 11.1.1, 12.2
Limitations of Time
3.10.1, 4.2.17, 4.2.20, 8.2.1, 9.3.3, 9.6.1, 9.8.4, 9.10.2, 10.2, 11.1.3, 12.1.1, 12.2.2.2, 12.2.5, 13.7, 14.1.1, 15.2.6.1
Loss of Use Insurance
11.3.3
Material Suppliers
1.5.1, 1.5.2, 3.12, 4.2.6, 4.2.8, 9.3.1, 9.3.1.2, 9.3.3, 9.5.3, 9.6.4, 9.6.5, 9.6.7, 9.10.5, 11.3.1
Materials, Hazardous
10.2.4, 10.3
Materials, Labor, Equipment and
1.1.3, 1.1.6, 1.5.1, 1.5.2, 3.4, 3.5, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.12.6, 3.12.10, 3.13.1, 5.2.1, 6.2.1, 9.3.1, 9.3.2, 9.3.3, 9.5.1, 9.5.3, 9.6.4, 9.6.5, 9.6.7, 9.10.2, 9.10.5, 10.2.1, 10.2.4, 10.3
Means, Methods, Techniques, Sequences and
Procedures of Construction
3.3.1, 3.12.10, 4.2.5, 4.2.11
Mechanic’s Lien
2.1.2, 15.2.8
Mediation
8.3.1, 10.3.5, 15.2.1, 15.2.5, 15.2.6, 15.3, 15.4.1
Minor Changes in the Work
1.1.1, 3.12.8, 4.2.13, 7.1, 7.4
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 3.11, 4.1.3, 4.2.14, 5.2.3, 7, 11.3.1
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.4.3, 9.8.3, 12.3
Nonconforming Work, Rejection and Correction of
2.3, 2.4, 3.2.3, 3.7.3, 9.4.3.3, 9.8.2, 9.8.3, 9.9.1, 11.1.1, 12.2.2.1, 12.2.3, 12.2.4, 12.2.5
Notice
1.5, 2.1.2, 2.2.1, 2.4, 3.2.4, 3.3.1, 3.7.1, 3.7.2, 3.7.5, 3.9.2, 3.12.9, 5.2.1, 6.3, 9.4.1, 9.7, 9.10.1, 9.10.2, 10.2.2, 10.2.6, 10.2.8, 10.3.2, 11.3.6, 12.2.2.1, 13.3, 13.5.1, 13.5.2, 14.1.2, 14.2.2, 14.4.2, 15.1.2, 15.1.4, 15.1.5.1, 15.2, 15.4.1
Notice of Claims
3.7.2, 10.2.8, 15.1.2, 15.4.1
Notice of Testing and Inspections
13.5.1, 13.5.2
Notices, Permits, Fees and
3.7, 7.3.7, 10.2.2
Observations, On-Site
3.2.1, 9.5.1, 12.1.1
Occupancy
2.2.2, 9.6.6, 9.9, 11.3.1.5
On-Site Inspections
4.2.2, 9.10.1, 9.4.4, 9.5.1
Orders, Written
4.2.7, 4.2.18, 4.2.20
Other Contracts and Contractors
1.1.4, 3.14.2, 4.2.9, 6, 11.3.7, 12.1.2
OWNER
2
Owner, Definition of
2.1.1
Owner, Information and Services Required of the
2.1.2, 2.2, 4.2, 6.1.2, 6.1.3, 6.2.5, 9.3.2, 9.6.1, 9.6.4,
9.9.2, 9.10.2, 10.3.3, 11.2, 11.3, 13.5.1, 13.5.2, 14.1.1,
14.1.3, 15.1.3
Owner’s Authority
1.5, 2.1.1, 2.3, 2.4, 3.4.2, 3.12.10, 3.14.2, 4.1.2, 4.1.3,
4.2.8, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2, 7.3.1,
8.2.2, 9.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2,
11.3.3, 11.3.10, 12.2.2.1, 12.3, 13.5.2, 14.2, 14.3.1,
14.4, 15.2.7
Owner’s Financial Capability
2.2.1, 13.2.2, 14.1.1
Owner’s Liability Insurance
11.2
Owner’s Relationship with Subcontractors
1.1.2, 5.2.1, 5.3, 5.4.1, 9.6.4, 9.10.2, 14.2.2
Owner’s Right to Carry Out the Work
2.4, 12.2.4, 14.2.2
Owner’s Right to Clean Up
6.3
Owner’s Right to Perform Construction with Own
Forces and to Award Other Contracts
6.1
Owner’s Right to Stop the Work
2.3
Owner’s Right to Suspend the Work
14.3
Owner’s Right to Terminate the Contract
14.2
Ownership and Use of Drawings, Specifications
and Other Instruments of Service
1.1.1, 1.1.5, 1.5, 1.6, 3.11, 3.12.10, 3.17, 4.2.14,
4.2.18, 4.2.20
Partial Occupancy or Use
9.9, 11.3.1.5
Patching, Cutting and
3.14, 6.2.5
Patents and Copyrights, Royalties
3.17
Payment, Applications for
4.2.1, 4.2.7, 4.2.15, 7.3.9, 9.2, 9.3, 9.4, 9.5, 9.7, 9.10.1,
9.10.3, 9.10.5, 11.1.3
Payment, Certificates for
4.2.15, 7.3.9, 9.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,
9.10.3, 14.1.1.3, 15.1.3
Payment, Failure of
9.4.1, 9.5, 9.7, 14.1.1.3
Payment, Final
4.2.1, 9.8.2, 9.10, 11.1.2, 11.3.1, 11.3.5, 12.3, 15.2.1
Payment Bond, Performance Bond and
5.4.1, 7.3.7, 9.6.7, 9.10.2, 9.10.3, 11, 11.4
Payments, Progress
9.3.1, 9.4.2, 9.6
PAYMENTS AND COMPLETION
9, 14
Payments to Subcontractors
5.4.2, 9.3, 9.5.1.3, 9.5.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7,
9.10.5, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
5.4.1, 7.3.7, 9.6.7, 9.10.2, 9.10.3, 11, 11.4
Permits, Fees, Notices and Compliance with Laws
2.2.2, 3.7, 7.3.7.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, 3.12, 4.2.9, 4.2.10, 4.2.14
Progress and Completion
8.2, 9.3.1, 9.4.2, 9.6, 9.8, 9.10, 14.2.4, 15.1.6
Progress Payments
9.3.1, 9.4.2, 9.6
Project, Definition of
1.1.4
Project Representatives
4.2.16
Property Insurance
10.2.5, 11.3
Project Schedule
3.10.1, 3.10.3, 3.10.4, 4.2.2, 4.2.3, 4.2.4
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1,
10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6,
14.1.1, 14.2.1, 15.2.8, 15.4
Rejection of Work
3.5, 4.2.8, 12.2.1
Releases of and Waivers and of Liens
9.10.2
Surety
5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2, 15.2.7
Surety, Consent of
9.10.2, 9.10.3
Surveys
1.1.7, 2.2.3
Suspension by the Owner for Convenience
14.3
Suspension of the Work
5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.7.4
Termination by the Contractor
14.1, 15.1.6
Termination by the Owner for Cause
5.4.1.1, 14.2, 15.1.6
Termination by the Owner for Convenience
14.4
Termination of the Contractor
14.2.2
TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.4, 3.3.3, 4.2.2, 4.2.6, 4.2.8, 9.4.3.3, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.5
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2, 7.3.1, 7.4, 8.3, 9.5.1, 10.3.2, 14.3.2, 15.1.5, 15.2.5
Time Limits
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.1, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.4.2, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.4, 12.2, 13.5, 13.7, 14, 15
Time Limits on Claims
3.7.4, 10.2.8, 13.7, 15.1.2
Title to Work
9.3.2, 9.3.3
Transmission of Data in Digital Form
1.6
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 7.3.4
Use of Documents
1.1.1, 1.5, 2.2.5, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.4.2
Waiver of Claims by the Construction Manager
13.4.2
Waiver of Claims by the Contractor
9.10.5, 13.4.2, 15.1.6
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.4.2, 14.2.4, 15.1.6
Waiver of Consequential Damages
14.2.4, 15.1.6
Waiver of Liens
9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, 11.3.7
Warranty
3.5, 4.2.15, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2
Weather Delays
15.1.5.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.3, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 10.3.2, 11.4.1, 13.2, 13.4.2, 15.4.4.2
Written Interpretations
4.2.17, 4.2.18
Written Notice
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 5.3, 5.4.1.1, 8.2.2, 9.4, 9.5.1, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 12.2.2, 12.2.4, 13.3, 13.5.2, 14, 15.4.1
Written Orders
1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1, 15.1.2
ARTICLE 1   GENERAL PROVISIONS
§ 1.1 Basic Definitions
§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor’s bid or proposal, or portions of addenda relating to bidding requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and the Construction Manager or the Construction Manager’s consultants, (3) between the Owner and the Architect or the Architect’s consultants, (4) between the Contractor and the Construction Manager or the Construction Manager’s consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner’s own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 1.1.5 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect’s consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.
§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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

§ 1.3 Capitalization
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation
In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service
§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect, or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 1.6 Transmission of Data in Digital Form
If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER
§ 2.1 General
§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic’s lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner’s interest therein.

§ 2.2 Information and Services Required of the Owner
§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the
portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner’s control and relevant to the Contractor’s performance of the Work with reasonable promptness after receiving the Contractor’s written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner’s Right to Stop the Work
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 Owner’s Right to Carry Out the Work
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner’s expenses and compensation for the Construction Manager’s and Architect’s and their respective consultants’ additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
§ 3.1 General
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner’s own forces, including persons or entities under separate contracts not administered by the Construction Manager.
§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor’s notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereofand, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.
§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor’s employees, Subcontractors and their agents and employees, and other persons performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials
§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor’s employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty
The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor’s warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes
The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws
§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction
Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect’s determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances
§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:
.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
.2 Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent
§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner’s consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor’s Construction Schedules
§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner’s and Architect’s information and the Construction Manager’s approval a Contractor’s construction schedule for the Work. The schedule shall not exceed time limits currently under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expedient and practicable execution of the Work.
The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor’s Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner’s own forces.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager’s and Architect’s approval. The Architect and Construction Manager’s approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor’s construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site
The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples
§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner’s own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor’s Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked...
and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect’s approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect’s approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site
§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor’s operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching
§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner’s own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner’s own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager.
Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor’s consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up
§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor’s tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner’s approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work
The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights
The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings. Specifications or other documents prepared by the Owner, Architect, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification
§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager’s and Architect’s consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER
§ 4.1 General
§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.
§ 4.1.3 Duties, responsibilities and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Construction Manager, Architect and Contractor. Consent shall not be unreasonably withheld.

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner’s representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor’s rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor’s failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner’s own forces shall be through the Owner.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general
whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect’s nor the Construction Manager’s authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager’s actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor’s submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect’s action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect’s professional judgment to permit adequate review. Upon the Architect’s completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor’s submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect’s review of the Contractor’s submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect’s review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect’s approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7. and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related
documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor’s compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect’s responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect’s response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.19 The Architect’s decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager’s recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager’s recommendation and the Architect’s response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change.
§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations
By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts
§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

1. assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

2. assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor’s compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor’s obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS
§ 6.1 Owner’s Right to Perform Construction with Own Forces and to Award Other Contracts
§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner’s own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.
§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility
§ 6.2.1 The Contractor shall afford the Owner’s own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner’s own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner’s own forces or other Multiple Prime Contractors’ completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor’s delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner’s own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner’s Right to Clean Up
If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7  CHANGES IN THE WORK
§ 7.1 General
§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders
A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:
.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives
§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:
.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Architect of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:
.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When
both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work
The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME
§ 8.1 Definitions
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time
§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner’s own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.
ARTICLE 9  PAYMENTS AND COMPLETION
§ 9.1 Contract Sum
The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values
Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor’s schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors’ schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment
§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor’s right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.3 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor’s knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment
§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager’s receipt of the Contractor’s Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor’s Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor’s Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect’s reasons for withholding certification in whole or in part as provided
in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect’s notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors’ Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors’ Applications for Payment by combining information from each Multiple Prime Contractors’ application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors’ Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors’ Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect’s reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect’s notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager’s certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager’s evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager’s certification will constitute a representation that, to the best of the Construction Manager’s knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect’s issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect’s evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect’s certification will constitute a representation that, to the best of the Architect’s knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor’s construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor’s right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager’s or Architect’s opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of
subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager’s or Architect’s opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

1. defective Work not remedied;
2. third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. damage to the Owner or a separate contractor;
6. reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
7. repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor’s portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary
liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment
If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager’s receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days’ written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor’s reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion
§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use
§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall
be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor’s Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager’s recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager’s and Architect’s final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor’s being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys’ fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

1. liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
2. failure of the Work to comply with the requirements of the Contract Documents; or
3. terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.
ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs
The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor’s safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager’s responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property
§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to
1. employees on the Work and other persons who may be affected thereby;
2. the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor’s Subcontractors or Sub-subcontractors;
3. other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
4. construction or operations by the Owner or other Contractors.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor’s obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor’s organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor’s superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.
§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB) encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor’s written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resumed upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor’s reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor’s fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner’s fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor’s discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor’s Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor’s operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a
Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

1. Claims under workers’ compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
2. Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor’s employees;
3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor’s employees;
4. Claims for damages insured by usual personal injury liability coverage;
5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
6. Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
7. Claims for bodily injury or property damage arising out of completed operations; and
8. Claims involving contractual liability insurance applicable to the Contractor’s obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor’s completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness. The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the Cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager’s consultants, the Owner, the Architect, and the Architect’s consultants as additional insureds for claims caused in whole or in part by the Contractor’s negligent acts or omissions during the Contractor’s operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor’s negligent acts or omissions during the Contractor’s completed operations.

§ 11.2 Owner’s Liability Insurance
The Owner shall be responsible for purchasing and maintaining the Owner’s usual liability insurance.

§ 11.3 Property Insurance
§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder’s risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.
§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect’s, Contractor’s, and Construction Manager’s services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance. The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. The Owner shall provide written notification to the Contractor of the cancellation or expiration of any insurance required by Sections 11.2 and 11.3. The Owner shall provide such written notice within five (5) business days of the date the Owner is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.
§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager’s consultants, Architect, Architect’s consultants, Owner’s separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner’s property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner’s duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager’s or Architect’s request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor’s expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner’s expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor’s expense.
unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work
§ 12.2.1 Before or After Substantial Completion
The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager’s and Architect’s services and expenses made necessary thereby, shall be at the Contractor’s expense.

§ 12.2.2 After Substantial Completion
§ 12.2.2.1 In addition to the Contractor’s obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the Contractor’s correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to the Contractor’s obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work
If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS
§ 13.1 Governing Law
The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.
§ 13.2 Successors and Assigns
§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner’s rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice
Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies
§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Construction Manager, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

§ 13.5 Tests and Inspections
§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner’s expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager’s and Architect’s services and expenses shall be at the Contractor’s expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.5.5 If the Construction Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.
§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest
Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 Time Limits on Claims
The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT
§ 14.1 Termination by the Contractor
§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days’ written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner’s obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days’ written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause
§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.
§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor’s surety, if any, seven days’ written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager’s and Architect’s services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner’s convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner’s convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract The responsibility to substantiate Claims shall rest with the party making the Claim.
§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor’s Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision
§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker’s sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision
§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor’s default, the Owner may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic’s lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation
§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration
§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a
notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder
§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.
Additions and Deletions Report for

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PAGE 1

ITD Garden City District 3 Shop Renovation
5800 North Coffey Street
Garden City, Idaho 83714
...

Petra Inc.
1097 North Rosario
Meridian, Idaho 83642
...

State of Idaho Transportation Department
3311 West State Street
Boise, Idaho 83707
...

CSHQ, a professional association
200 Broad Street
Boise, Idaho 83702

PAGE 31

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys’ fees.

PAGE 34

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal
or replacement of each required policy of insurance. These certificates and the insurance policies required by this
Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to
expire until at least 30 days prior written notice has been given to the Owner. An additional certificate evidencing
continuation of liability coverage, including coverage for completed operations, shall be submitted with the final
Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage
until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be
furnished by the Contractor with reasonable promptness. The Contractor shall provide written notification to the
Owner of the cancellation or expiration of any insurance required by Section 11.1. The Contractor shall provide such
written notice within five (5) business days of the date the Contractor is first aware of the Cancellation or expiration, or
is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that
includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable
conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that
the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days’ prior
written notice has been given to the Contractor. The Owner shall provide written notification to the Contractor of the
cancellation or expiration of any insurance required by Sections 11.2 and 11.3. The Owner shall provide such written
notice within five (5) business days of the date the Owner is first aware of the cancellation or expiration, or is first
aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.
Certification of Document’s Authenticity
AIA® Document D401™ – 2003

I., hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 12:50:41 on 05/08/2018 under Order No. 8664676036 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)
SECTION 007300 - SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.01 SUMMARY
   A. These Supplementary Conditions amend and supplement the General Conditions defined in Document 007200 - General Conditions and other provisions of the Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
   B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.02 RELATED SECTIONS
   A. Section 005000 - Contracting Forms and Supplements.
   B. Section 014216 - Definitions.

1.03 MODIFICATIONS TO GENERAL CONDITIONS
   A. THE SUPPLEMENTARY CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.

END OF SECTION 007300
SUPPLEMENTARY CONDITIONS

The following supplements modify the "General Conditions of the Contract for Construction", AIA Document A232/CMa, 2009. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

ARTICLE 2   OWNER

2.1   General

Add to 2.1.1 the following:

2.1.1.1   The Administrator of the Idaho Transportation Department shall be the sole representative of the State of Idaho and here and after shall be designated as the Owner. Wherever in these specifications and contract the term "Owner" shall mean the State of Idaho as represented by the Administrator of the Idaho Transportation Department or an authorized representative.

2.1.1.2   The Owner will assign a Project Manager and a Field Representative to represent the Owner. The Field Representative's duties, responsibilities and limitations of authority are set forth in accordance with agency guidelines, which are available to the Contractor.

Delete subparagraph 2.1.2

2.2   Information and Services Required of the Owner

Delete subparagraph 2.2.1

Delete subparagraph 2.2.2 and substitute the following:

2.2.2   The Owner may furnish to the Architect for inclusion with the Contract Documents surveys describing physical characteristics and utility locations for the site of the project.

Delete subparagraph 2.2.3 and substitute the following:

2.2.3   Except for permits and fees, including those required under subparagraph 3.7.1 and 3.7.1.1, which are the responsibility of the Contractor under the Contract Documents, the Owner will secure and pay for the plan check fee required by the Division of Building Safety, conditional use permits, and any other permits and fees specifically indicated in the Contract Documents to be secured and paid for by the Owner. The State of Idaho is exempt from taxes and use fees and connection fees that can be construed as taxes, and will not pay for or reimburse the Contractor for any such payments made by the Contractor.

Delete subparagraph 2.2.5 and substitute the following:

2.2.5   The Contractor will be furnished free of charge electronic copies of Drawings and Project Manuals.

2.4   Owner’s Right to Carry Out the Work

In subparagraph 2.4.1 delete the next to last sentence.

ARTICLE 3   CONTRACTOR
In subparagraph 3.3.4 delete the period at the end of first sentence and add the following words …“and shall report any defects to the Construction Manager.”

3.6 Taxes

Add to 3.6 the following:

3.6.2 The Contractor, in consideration of securing the business of erecting or constructing public works in this State, recognizing that the business in which he is engaged is of a transitory character, and that in the pursuit thereof, his property used therein may be without the state when taxes, excises, or license fees to which he is liable become payable, agrees:

1. To pay promptly when due all taxes (other than on real property), excises and license fees due to the state, its sub-divisions, and municipal and quasi-municipal corporations therein, accrued or accruing during the term of this contract, whether or not the same shall be payable at the end of such term;

2. That if the said taxes, excises, and license fees are not payable at the end of said term, but liability for the payment thereof exists even though the same constitute liens upon his property, to secure the same to the satisfaction of the respective officers charged with the collection thereof; and

3. That, in the event of his default in the payment or securing of such taxes, excises, and license fees, to consent that the department, officer, board, or taxing unit entering into this contract may withhold from any payment due him hereunder the estimated amount of such accrued and accruing taxes, excises, and license fees for the benefit of all taxing units to which said contractor is liable.

3.6.3 Before entering into a contract, the Contractor shall be authorized to do business in the state and shall submit a properly executed Contractor's Affidavit Concerning Taxes. (Page CA-1)

3.6.4 Within ten days of receipt of forms from Owner, Contractor shall complete and return to Owner forms as required by tax collector, showing dates, names, addresses, contracting parties, including all subcontractors, and all other relevant information, which may be required.

3.7 Permits, Fees and Notices

Add to 3.7.1 the following:

3.7.1.1 The Owner shall obtain and pay for plan check fees required by the Idaho, Division of Building Safety.

3.7.1.2 The Contractor shall pay for plumbing and electrical permits required by the Idaho Division of Building Safety or local authority. The Contractor shall obtain and pay for all licenses and permits and shall pay all fees and charges for connections to outside services and for the use of municipal or private property for storage of materials, parking, utility services, temporary obstructions, enclosures, opening and patching of streets, etc., off of the property of the State arising from the construction and completion of the Work.

3.9 Foreman/Project Manager

Delete subparagraph 3.9.1 and substitute the following:
3.9.1 The Contractor shall employ a competent foreman and necessary assistants, as needed, to oversee execution of the project. The foreman shall be in attendance at the Project site during the progress of the Work. The foreman and project manager, if the Contractor utilizes a project manager, shall be reviewed and approved by the Architect and Owner, and neither shall not be changed except with the consent of the Architect and Owner, unless the foreman or project manager, if a project manager is used, cease to be employed by the Contractor. Under this circumstance, any new foreman or new project manager must be satisfactory to the Architect and Owner. The foreman, and any project manager, shall represent the Contractor and all communications given to the foreman or project manager are deemed given to the Contractor. Important communications will be confirmed in writing.

3.10 Contractor's Construction Schedules

Add to 3.10.1 the following:

3.10.1.1 The Contractor shall schedule and perform the work in accordance with a Critical Path Method (CPM) to indicate the rate of progress and practical order of the project. The purpose of this scheduling requirement is to assure adequate planning, coordination and execution of the work, so that the Owner, Construction Manager and the Architect can evaluate work progress. The schedule shall indicate the dates for starting and completing various aspects of the work including the submittal, approval, procurement, fabrication and delivery of major items, material, and equipment as well as on site construction activities. The Contractor's schedule shall demonstrate the order, interdependence, and sequence of activities. Related activities shall be grouped on the schedule. Critical paths shall be highlighted or distinguished. The schedule shall include all the dates specified in the contract for substantial and final completion of the work. The time limit set forth in the contract documents for substantial completion and final completion must govern; the schedule must be adjusted to meet these dates. The Contractor shall submit to the Owner, Construction Manager and Architect a CPM schedule within three (3) weeks after award of the contract, and maintain such schedule on a current basis in accordance with the Contract Documents.

3.10.1.2 Once a month, or at intervals as required by the Construction Manager, the Contractor shall advise the Owner, Construction Manager and the Architect of the status of the Work (in duplicate) on marked copies of the current CPM schedule. If any Work is not on schedule, the Contractor shall immediately advise the Owner, Construction Manager and Architect in writing of the proposed action to bring the Work on schedule and shall submit two (2) copies of the schedule showing changes and a typed list of the changes. The Contractor shall also submit a narrative report with each monthly schedule update, which report shall include a description of current and anticipated problem areas, delaying factors and their impact, and explanation of corrective action taken or proposed. If the project is behind schedule, the Contractor shall indicate what measures he will take to put the Work back on schedule.

Add to 3.10.3 the following:

3.10.3.1 If the Work is not on schedule, as determined by the Construction Manager and the Owner, and the Construction Manager and Owner do not believe the Contractor's proposed action to bring the Work on schedule is adequate, then the progress of the Work shall be deemed unsatisfactory. In such event, in addition to its rights under Article 14, the Owner, at its discretion, may require the Contractor to work such additional time over regular hours, including Saturdays, Sundays, and holidays, without additional cost to the Owner to bring the work on schedule.

3.12 Shop Drawings, Product Data and Samples

In the first sentence of subparagraph 3.12.6 delete the word "approved" and insert the word "reviewed".
In the first and last sentences of subparagraph 3.12.8 delete the word “approval” and insert the word “review”.

**ARTICLE 4  ADMINISTRATION OF THE CONTRACT**

**4.1   Architect**

After subparagraph 4.1.1 add the following:

**4.1.1.1** Throughout the contract documents where the term Architect is used it shall be interpreted to mean the design Engineer as identified on the cover of the project manual.

Delete subparagraph 4.5.

**4.6   Administration of the Contract**

In subparagraph 4.6.1, delete from the first sentence “and will be the Owner’s representatives.”

Delete subparagraph 4.6.17 and substitute the following:

**4.6.17** The Architect will provide a project representative and indicate the limitations of his authority during the construction of the Work. The Owner will assign a Project Manager to the project and will also assign a Field Representative who will observe the work and report to the Architect and the Owner's Project Manager. The Construction Manager will provide a project superintendent who will oversee, coordinate and assist in the scheduling the work of the Contractors.

**4.7   Claims and Disputes**

In subparagraph 4.7.2 delete all references to arbitration. In the third sentence after the words “(2) the Architect” delete the words “has not received evidence or”.

Delete subparagraph 4.7.3 and substitute the following:

**4.7.3** Time Limits on Claims. A Claim by either party must be made by written notice to the Architect within ten (10) days from the date of the occurrence of the event or discovery of the condition, giving rise to the Claim or within ten (10) days from the date that the Claimant knew or should have known of the event or condition. Unless the Claim is made within the aforementioned time requirements, it shall be deemed to be waived. The written notice of Claim shall include a factual statement of the basis for the Claim, pertinent dates, contract provisions offered in support of the Claim, additional materials offered in support of the Claim and the nature of the resolution sought by the Claimant. The Architect will not consider, and the Owner shall not be responsible or liable for, any Claims from subcontractors, suppliers, manufacturers, or other persons or entities not a party to this Contract. Once a Claim is made, the Claimant shall cooperate with the Architect and the party against whom the Claim is made in order to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition.

In subparagraph 4.7.4 delete the word “arbitration” and insert the word “mediation”.

Delete subparagraph 4.7.6 and substitute the following:

**4.7.6** Concealed or Unknown Conditions. If conditions are encountered at the site which are subsurface or are otherwise concealed or unknown physical conditions which differ materially from those indicated in the Contract Documents or which were not reasonably susceptible of being disclosed by the Contractor's
examination of the site in accordance with Subparagraph 4.7.6.1 of these Supplementary Conditions, then notice by the observing party shall promptly be given to the Architect and the other party before the conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially from the Contract Documents or if they were not reasonably susceptible of being disclosed by the Contractor’s examination of the site, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both, if the conditions cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Contract. If the Architect determines that the conditions at the site do not warrant an adjustment in the Contract terms, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. If the Owner and the Contractor cannot agree on an equitable adjustment to the Contract terms or otherwise disagree with the determination of the Architect, the matter shall be subject to further proceedings in accordance with Paragraph 4.8.

Add to 4.7.6 the following:

4.7.6.1 The Contractor agrees and acknowledges that he has had sufficient time and opportunity to examine the Contract Documents and the site of the work in order to undertake any necessary actions to determine the character of the subsurface materials and site conditions to be encountered. No adjustment in the Contract Time or Contract Sum shall be permitted in connection with a subsurface, concealed or unknown site condition which does not differ in any material respect from those conditions disclosed or which reasonably should have been disclosed or identified by the Contractor’s examination of the Contract Documents and the site of the work.

Add to 4.7.7 the following:

4.7.7.1 The Contractor shall not be entitled to an adjustment in Contract Time or in Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by the Contractor or anyone for whose acts the Contractor is responsible. The Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in Contract Sum, if the cost or time of Contractor’s performance is delayed or changed due to the fault of the Owner. To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, the Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, but shall not be entitled to an adjustment in Contract Sum. In the event that the Contractor is entitled to an adjustment in Contract Sum, the Owner will pay only for the following verifiable costs directly associated with the time extension or delay: 1) the actual labor costs, fringe benefits, employment taxes and insurance related to the Project Superintendent; 2) the cost associated with the fair rental value of the Project Superintendent’s vehicle directly related to the time extension; 3) the direct costs attributable to the extension for the field office facility, including telephone lines, utilities, power, lights, water, and sewer (toilets). Mark-up on these costs will not be allowed. The Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay regardless of cause.

Add to 4.7.8 the following:

4.7.8.3 All Claims for costs related to Claims for additional time shall be pursuant to Subparagraph 4.7.7. The Contractor shall not be entitled to make a Claim for adjustment in the Contract Sum based upon the matter of adverse weather conditions or force majeure.

4.8 Resolution of Claims and Disputes

In subparagraph 4.8.1 delete actions (4) and (5) and substitute the following:
(4) recommend approval of all or part of the Claim, or (5) attempt to facilitate the resolution of the Claim through informal negotiations.

In subparagraph 4.8.4, in the first sentence delete the word “arbitration” and substitute the word “litigation”.

4.9 Arbitration

Delete entirely all subparagraphs in 4.9 and substitute the following:

4.9.1 The Contractor and the Owner shall not be obligated to resolve any Claim or dispute related to this Contract by arbitration. Upon agreement of the parties any Claim related to this Contract may be submitted to arbitration, either binding or non-binding, upon mutually agreeable terms and conditions. In the absence of such agreement, any reference in this Contract to arbitration is void and has no force or effect.

4.9.2 Mediation

4.9.2.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Subparagraph 9.10.4 shall, after final decision by the Construction Manager, be subject to mediation as a condition precedent to the institution of legal or equitable proceedings by either party.

4.9.2.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association.

4.9.2.3 The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in the place where the project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

5.4 Contingent Assignment of Subcontracts

In subparagraph 5.4.2 delete the number “30” and insert the number “60”.

ARTICLE 7 CHANGES IN THE WORK

7.2 Change Orders

Add to 7.2 the following:

7.2.2.1 The amount allowed for overhead and profit on any change order is limited to the amounts indicated in subparagraph 7.3.10 of these Supplementary Conditions.

7.2.3 Any Change Order prepared, including but not limited to those arising by reason of the parties’ mutual agreement or by mediation, shall constitute a final and full settlement of all matters relating to or affected by the change in the work, including, but not limited to, all direct, indirect and consequential costs associated with such change and any and all adjustments to the Contract Sum and Contract Time. In the event a Change Order increases the Contract Sum, the Contractor shall include the work covered by such Change Order in the Application for Payment as if such work were originally part of the Project and Contract Documents.
7.2.4 By the execution of a Change Order, the Contractor agrees and acknowledges that he has had sufficient time and opportunity to examine the change in work which is the subject of the Change Order and that he has undertaken all reasonable efforts to discover and disclose any concealed or unknown conditions which may to any extent affect the Contractor’s ability to perform in accordance with the Change Order. Aside from those matters specifically set forth in the Change Order, the Owner shall not be obligated to make any adjustments to either the Contract Sum or Contract Time by reason of any conditions affecting the change in work addressed by the Change Order that could have reasonably been discovered or disclosed by the Contractor’s examination.

7.3 Construction Change Directives

After subparagraph 7.3.1 add the following:

7.3.1.1 A Construction Change Directive, within limitations, may also be used to incorporate minor changes in the work agreed to by the Architect’s representative, the Idaho Transportation Department Field Representative, and the Contractor’s Foreman. The limits of these representatives’ authority with regard to Construction Change Directives shall be documented in writing by the Architect, Owner and Contractor.

Add to the following:

In subparagraph 7.3.4 after the word "Architect" insert the following words: "in writing within forty-eight hours ",... The balance of the subparagraph remains unchanged.

In subparagraph 7.3.5, in the last sentence, delete “recorded as a” and substitute “incorporated into a future”.

In subparagraph 7.3.6, in the first sentence, delete the words “a reasonable allowance for overhead and profit” and substitute the words “an allowance for overhead and profit in accordance with subparagraph 7.3.10 of these Supplementary Conditions.” In the second sentence after the words “In such case,” add the words “of an increase in Contract Sum”.

Delete entirely subparagraph 7.3.7 and substitute the following:

7.3.7 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties’ agreement with part or all of such costs.

Add to 7.3 the following:

7.3.10 For purposes of subparagraphs 7.2.2.1 and 7.3.6 of these Supplementary Conditions, the allowance for combined overhead and profit shall be limited as follows, unless otherwise provided in the Contract Documents:

.1 for total changes of $10,000 or less in direct cost, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier, combined shall not exceed twenty percent (20%) of direct costs.

.2 for total changes exceeding $10,000 in direct cost, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier, combined shall not exceed fifteen percent (15%) of direct costs.

.3 the Contractor will determine the apportionment between the Contractor and its subcontractors of allowable amounts of overhead, profit, bonds and insurance.

ARTICLE 8 TIME

SUPPLEMENTARY CONDITIONS
8.1 Definitions

Add to subparagraph 8.1.1 the following:

8.1.1.1 The Contractor shall substantially complete the work as defined by Subparagraph 9.8.1 within ______ consecutive calendar days after the date indicated to proceed in the Notice to Proceed as defined by Subparagraph 8.1.2.

In subparagraph 8.1.2, delete the word "Agreement" and substitute the words "Notice to Proceed".

8.3 Delays and Extensions of Time

In subparagraph 8.3.1 delete the word "arbitration" and substitute the word "litigation".

Delete subparagraph 8.3.3 and substitute the following:

8.3.3 Notwithstanding any term, condition or provision to the contrary in this Contract, the remedies available to the Contractor for adjustments of Contract Time and Contract Sum by reason of delay shall be only those set forth in subparagraph 4.7.7.1 of these Supplementary Conditions.

8.3.4 If the Contractor submits a progress report or schedule indicating, or otherwise expressing an intention to achieve completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

ARTICLE 9 PAYMENTS AND COMPLETION

9.3 Applications for Payment

In subparagraph 9.3.1, in the first sentence, delete the words "At least fifteen days" and substitute the following:

"On or before the date of the monthly progress meeting, but not less than thirty (30) days"

In subparagraph 9.3.1.1, delete the words "but not yet" and substitute the word "and".

Add to 9.3.1. the following:

9.3.1.3 The form of Application for Payment shall be DPW Form Contractor Request for Payment, supported by Idaho Transportation Department Breakdown. Submit one original.

Add to 9.3.2 the following:

Off site storage will not be approved at locations more than thirty (30) miles from the project site or outside the State. Any materials stored off site and paid for by the Owner shall be physically marked as being the property of the State of Idaho.

9.6 Progress Payments

Add to 9.6.1 the following:
9.6.1.1 Until conditions set forth in paragraph 9.10 are met, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments. If the Construction Manager and the Architect determine that the Contractor has made or is making satisfactory progress on any uncompleted portions of the work, the Owner may, at its discretion, release a portion of the retainage to the Contractor prior to the actual final completion of the conditions set forth in Paragraph 9.10.

9.6.1.2 Progress Payments shall fall due twenty-one (21) days after the Construction Manager’s and Architect’s Certificate for Payment is received by the Owner.

Add to 9.6.2 the following:

9.6.2.1 The Contractor shall not withhold from a subcontractor, or supplier more than the percentage withheld from a payment certificate for the subcontractor’s or supplier’s portion of the work.

9.7 Failure of Payment

Delete paragraph 9.7 and subparagraph 9.7.1

9.8 Substantial Completion

Add to 9.8.3 the following:

The payment shall be sufficient to increase the total payment to ninety-five percent (95%) of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims.

9.10 Final Completion and Final Payment

In subparagraph 9.10.1, at the end of the third sentence delete the words “… and that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable”.

Add to 9.10.1 the following:

9.10.1.1 The final retainage shall become due and payable to the Contractor in not more than thirty (30) days after issuance of the final Certificate for Payment by the Construction Manager, provided that the conditions of subparagraph 9.10.2 are fully satisfied.

Add to 9.10.2 the following:

The following forms shall be used as noted for requirements of subparagraph 9.10.2 and must be submitted prior to or along with the submittal of the Contractor’s final request for payment, including release of any retainage.

1. For subparagraph 9.10.2 (2) submit a completed Contractor’s Affidavit of Debts and Claims (AIA form G706, 1994 ed.).

2. For subparagraph 9.10.2 (4) submit a completed Consent of Surety to Final Payment (AIA form G707, 1994 ed.).

3. For subparagraph 9.10.2 (5) submit: (i) a Public Works Contract Tax Release issued by the Idaho Tax Commission (See “Request for Tax Release” form, page CRTR-1, to be submitted by Contractor to the Idaho Tax Commission); and (ii) a Release of Claims (DPW form, page RC-1).

Add to Article 9 the following:

SUPPLEMENTARY CONDITIONS

BOILR-2005 CM revised 02/27/17

(18-305)

(May, 2018)
9.11 Liquidated Damages

9.11.1 The Owner will suffer financial loss in an amount that is difficult to quantify if the Project is not Substantially Complete on the date set forth in the Contract Documents. The Owner may assess liquidated damages against the Contractor (and its surety) in an amount of ______________ Dollars ($___) per calendar day, as fixed, agreed and liquidated damages and not a penalty, for each calendar day of delay until the Work is Substantially Completed. In the event liquidated damages are caused by the Contractor and another entity, Owner may reasonably apportion damages. The right to assess liquidated damages is in addition to, and not in limitation of, any right or remedy available to the Owner or to protect the Owner to address delay by the Contractor, whether such right or remedy is under law, in equity or under Contract Documents.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions and Programs

Add to 10.1.1 the following:

10.1.1.1 The Contractor shall maintain, in compliance with Idaho Code, Title 72, Chapter 17, a drug-free workplace program throughout the duration of this contract and shall only subcontract work to subcontractors who have programs that comply with Idaho Code, Title 72, Chapter 17.

In subparagraph 10.1.2, in the last sentence after the word "Architect", delete the balance of the sentence.

Add to 10.1.3 the following:

10.1.3.1 Reference to asbestos or polychlorinated biphenyl (PCB) in this Article does not negate the appropriate abatement of asbestos and PCB containing materials as specifically required by the Contract

Delete subparagraph 10.1.4.

10.2 Safety of Persons and Property

Add to 10.2.4 the following:

10.2.4.1 When use or storage of explosives or other hazardous materials or equipment or unusual methods is necessary, the Contractor shall give the Owner reasonable advance written notice.

10.3 Emergencies

In subparagraph 10.3.1 delete the last sentence.

ARTICLE 11 INSURANCE AND BONDS

11.1 Contractor’s Liability Insurance

In subparagraph 11.1.1.1 substitute a comma for the semicolon at the end, and add the following: “including private entities performing Work at the site and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project;”
In subparagraph 11.1.1.2 delete the semicolon at the end, and add the following: “or persons or entities excluded by statute from the requirements of Clause 11.1.1.1 but required by the Contract Documents to provide the insurance required by that Clause;”

Add to 11.1.2 the following:

11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following limits:

1. Workers’ Compensation:

   (a) State: 
   
   (b) Employer’s Liability: $100,000 per Accident $500,000 Disease, Policy Limit $100,000 Disease, Each Employee

2. Comprehensive Commercial General Liability and Umbrella Liability Insurance. Contractor shall maintain Commercial General Liability ("CGL") and, if necessary, commercial umbrella insurance with a limit of not less than $1,000,000 each occurrence. If such CGL insurance contains a general aggregate limit, it shall apply separately to this project location;

   CGL insurance shall be written on Insurance Services Office ("ISO") occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage) and shall cover liability arising from premises, operation, independent contractors, products-completed operations, personal (including employee acts) and advertising injury and liability assumed under an insured contract (including the tort liability of another assumed in a business contract). As applicable, coverage must also include a broad form CGL endorsement if the substitute insurance is a 1973 edition CGL or its equivalent;

   Owner shall be included as an additional insured under the CGL, using ISO additional insured endorsement CG 20 10 and CG 20 37 or their equivalent, which endorsement shall include coverage for the Owner with respect to liability arising out of the Work, including completed operations of Contractor, and which coverage shall be maintained in effect for the benefit of Owner for a period of two (2) years following the completion of the work specified in this Contract. Additional insured coverage as required in this subparagraph shall apply as primary insurance with respect to any other insurance or self-insurance programs afforded to the Owner;

   (a) For the hazards of explosion, collapse, and damage to underground property, commonly referred to as XCU, coverage shall be required if the exposures exist; and

   This coverage may be provided by the subcontractor if the Owner and prime Contractor are named as additional insureds;

3. Business Auto and Umbrella Liability Insurance: Contractor shall maintain business, auto liability and, if necessary, commercial umbrella liability insurance with a limit of not less than $1,000,000 each accident;

   Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos);
Business auto coverage shall be written on ISO form CA 00 01, CA 00 05, CA 00 12, CA 00 20 or a substitute form providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01;

If hazardous waste will be hauled, Contractor shall obtain pollution liability coverage equivalent to that provided under the ISO pollution liability-broadened coverage for covered autos endorsement (CA 99 48) and the Motor Carrier Act endorsement (MCS 90) shall be attached;

4. If the General Liability coverages are provided by Commercial Liability policies the:
   (a) General Aggregate shall be not less than $2,000,000; and
   (b) Fire legal liability shall be provided in an amount not less than $100,000 per occurrence; and

5. Umbrella Excess Liability. An umbrella policy may be used in combination with other policies to provide the required coverage.

11.1.2.2 The Owner, Architect, and Construction shall be named as an additional insured on the insurance required in 11.1.2.1 items 2, 3 and 5 above and the insurance shall contain the severability of interest clause as follows:

"The insurance afforded herein applies separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the company's 'liability'."

11.1.2.3 The Contractor shall require all subcontractors of any tier to provide Commercial General Liability Insurance with liability limits of not less than $1,000,000 for bodily injury and property damage, and Business Automobile Liability Insurance for all owned, non-owned and hired vehicles with liability limits of not less than $1,000,000.

Add to 11.1.3 the following:

11.1.3.1 If this insurance is written on the Comprehensive General Liability policy form; the Certificates shall be AIA Document G705, Certificate of Insurance or ACORD form 25. If this insurance is written on a Commercial General Liability policy form, ACORD form 25S will be acceptable.

Delete Paragraph 11.3 in its entirety and insert the following:

11.3 Property Insurance

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a Builder's risk “all-risk” or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and the cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is later. This insurance shall include the
interests of the Owner, the Construction Manager, the Contractor, Subcontractors and Sub-subcontractors in the Project.

11.3.1.1 Property insurance shall be on an “all-risk” or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect’s, Construction Manager’s, and Contractor’s services required as a result of such insured loss.

11.3.1.2 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

11.3.1.3 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance, which shall specifically cover such insured objects during installation and until final acceptance by the Owner. This insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.3 Loss of Use Insurance. The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of the Owner’s property due to fire or other hazards, however caused.

11.3.4 Within thirty (30) days of Notice to Proceed, the Owner shall provide to the Contractor evidence of the insurance coverages required by this Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least thirty (30) days’ prior written notice has been given to the Contractor.

11.3.5 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other and (2) the Architect, Architect’s consultants, Construction Manager, Construction Manager’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages to the Work caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner. The Owner or Contractor, as appropriate, shall require of the Architect, Architect’s consultants, Construction Manager, Construction Manager’s consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The Owner does not waive its subrogation rights to the extent of its property insurance on structures or portions of structures that do not comprise the Work.

11.3.6 The Contractor authorizes the Owner to negotiate and agree on the value and extent of, and to collect the proceeds payable with respect to, any loss under a policy of insurance carried by the Owner pursuant to any of the provisions of this Paragraph 11.3. The Owner shall have full right and authority to
compromise any claim, or to enforce any claim by legal action or otherwise, or to release and discharge any insurer, by and on behalf of the Owner and Contractor. The Owner shall provide written notice to Contractor of (i) its having reached any such settlement or adjustment with an insurer and (ii) the receipt of any funds pursuant to this Paragraph 11.3. Any objection by the Contractor to a settlement or adjustment made under this Paragraph 11.3 must be made in writing to the Owner within five (5) business days of the notice from the Owner. The Owner and the Contractor agree to attempt to resolve the dispute by mutual agreement.

11.3.7 A loss under the Owner’s property insurance shall be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear, subject to requirements of any applicable mortgage clause.

11.3.8 The Owner shall deposit proceeds so received, in a manner in which such proceeds can be separately accounted for, which proceeds the Owner shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

11.3.9 The Contractor shall pay Subcontractors their shares of the insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to acknowledge the Owner’s authority under this Paragraph 11.3 and make payments to their Sub-subcontractors in similar manner.

11.3.10 Nothing contained in this Paragraph 11.3 shall preclude the Contractor from obtaining solely at its own expense, insurance on its behalf.

Add to 11.4.1 the following:

11.4.1.1 The form of bonds shall be AIA A312, Performance Bond, 1984 Edition and AIA A312 Payment Bond, 1984 Edition. Bonds shall be unmodified except as indicated below:

.1 Modification of the Performance Bond will not be accepted.

.2 The following modifications of the Payment Bond are acceptable:

a.) Subparagraph 4.3 may be added as follows:

4.3 Claimant has furnished to Surety proof of claim duly sworn to by Claimant, along with adequate supporting documentation which proves the amount claimed is due and payable.

b.) Paragraph 5 may be amended as follows:

5 If a notice required by paragraph 4 is given by Owner to the Contractor and to the Surety, that is sufficient compliance.

c.) Paragraph 6 may be deleted and the following paragraph may be substituted in its place.

6 When the claimant has satisfied the conditions of Paragraph 4, and has submitted all supporting documentation and any proof of claim requested by the Surety, the Surety shall, within a reasonable period of time, but not more than 120 days, notify the Claimant of the amounts that are undisputed and the basis for challenging any amounts that are disputed, including but not limited to, lack of substantiating documentation to support the claim as to entitlement or amount, and the Surety shall, within a reasonable time, but not more than 120 days, pay or make arrangements for payment of any undisputed amount; provided, however, that the failure of the Surety to timely discharge of its obligations under this paragraph or to dispute or identify any specific defense to all or any part of a claim shall not be deemed to be an admission of liability by the Surety as to such claim or otherwise
constitute a waiver of the Contractor’s or Surety defenses to or right to dispute such claim. Rather, the Claimant shall have the immediate right, without further notice, to bring suit against Surety to enforce any remedy available to it under this Bond.

.3 Modifications other than the above must be approved by the Owner prior to issuance of the Bond.

Add to Article 11 the following:

11.5 Indemnity

11.5.1 The Contractor shall indemnify, defend and save harmless the Owner, the Construction Manager, the Architect, the Construction Manager’s Consultants, and the Architect's Consultants from and against all claims, damages, costs, legal fees, expenses, actions and suits whatsoever including injury or death of others or any employee of the Contractor, subcontractors, or the sub-subcontractors, agents or employees, caused by failure to comply fully with any term or condition of the Contract, or caused by damage to or loss of use of property, directly or indirectly, by the carrying out of the work, or caused by any matter or thing done, permitted or omitted to be done by the Contractor, his agents, subcontractors or employees and occasioned by the negligence of the Contractor, his agents, subcontractors or employees.

ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 Governing Law

Add to 13.1 the following:

13.1.2 Each Contractor and his subcontractors and sub-subcontractors shall comply with all Idaho Statutes with specific reference to Public Works Contractor’s State License Law, Title 54, Chapter 19, Idaho Code, as amended.

13.1.3 Pursuant to Sections 44-1001 and 44-1002, Idaho Code, it is provided that each Contractor “must employ ninety-five percent (95%) bona fide Idaho residents as employees, except where under such contracts fifty or less persons are employed, the Contractor may employ ten percent (10%) non-residents, provided, however, in all cases employers must give preference to the employment of bona fide residents in the performance of said work, and no contract shall be let to any person, firm, association or corporation refusing to execute an agreement with the above-mentioned provisions in it; provided that in contracts involving the expenditure of Federal Aid Funds this act shall not be enforced in such a manner as to conflict with or be contrary to the federal statutes prescribing a labor preference to honorable discharged soldiers, sailors, or marines, prohibiting as unlawful any other preference or discrimination among citizens of the United States.”

13.6 Interest.

Delete subparagraph 13.6.1 and substitute the following:

13.6.1 Payments validly due but unpaid under the Contract Documents (21 days from date received by the Owner) shall bear no interest until thirty (30) days past due, thereafter they shall bear interest at the rate of five percent (5%) per annum until the date of the check as posted by the State Controller.

13.7 Commencement of Statutory Limitation Period

Delete subparagraphs 13.7.1, 13.7.1.1, 13.7.1.2, and 13.7.1.3 and substitute the following:
13.7.1 As between the Owner and Contractor as to acts or failures to act, any applicable statute of
limitations shall commence to run and any legal cause of action shall be deemed to have accrued in any and
all events in accordance with Idaho law.

Add to Article 13 the following:

13.8 Equal Opportunity

13.8.1 The Contractor shall maintain policies of employment as follows:

13.8.1.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee
or applicant for employment because of race, religion, color, sex, age or national origin. The Contractor shall
take affirmative action to insure that applicants are employed, and that employees are treated during
employment without regard to their race, religion, color, sex, age or national origin. Such action shall include,
but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment
advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training
including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and
applicants for employment, notices setting forth the policies of non-discrimination.

13.8.1.2 The Contractor and the Contractor's Subcontractors shall, in all solicitation or advertisements for
employees placed by them or on their behalf, state that all qualified applicants will receive consideration for
employment without regard to race, religion, color, sex, age or national origin.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 Termination by the Contractor

In subparagraph 14.1.1, in the first sentence, after the word “Contractor” insert the words “in accordance with
this subparagraph”. Also in the first sentence delete the number “30” and substitute the number “60”.

Delete subparagraphs 14.1.1.3 and 14.1.1.4, and 14.1.1.5.

In subparagraph 14.1.2 delete the words "profit and damages” and substitute the words "and profit”.

Delete subparagraph 14.1.3.

14.2 Termination by the Owner for Cause

Add the following subparagraph to 14.2:

14.2.5 Nothing in this Article shall delete or diminish Owner’s rights under Subparagraph 3.10.3.1.

Add to Article 14 the following:

14.4 Termination by the Owner for Convenience

14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without
cause.

14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:
.1 Cease operations as directed by the Owner in the notice;

.2 Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 Except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Subcontracts and purchase orders and enter into no further Subcontracts and purchase orders.

14.4.3 In the case of such termination for the Owner convenience, the Contractor shall be entitled to receive payment from the Owner on the same basis provided in Subparagraph 14.1.2.

END OF SUPPLEMENTARY CONDITIONS
SECTION 011000 - SUMMARY

PART 1  GENERAL

1.01  PROJECT

A. Project Name: ITD (18-305) D3 Shop Renovation
B. Owner's Name: State of Idaho - Idaho Transportation Department.
C. Architect's Name: CSHQA.
D. The Project consists of the alteration of Maintenance, shop and office facility.

1.02  CONTRACT DESCRIPTION

A. Contract Type: Multiple prime contracts, each based on a Stipulated Price as described in Document 005000 - Contracting Forms and Supplements.

1.03  DESCRIPTION OF ALTERATIONS WORK

A. Summary of Work:

The work includes addressing select life-safety and ADA code compliance improvements, up-grades to the mechanical and electrical systems and a selection of architectural improvements as noted. The Bid-Package/Bid Forms enclosed, in conjunction with the plans and specifications, along with the information accessible to you at the scheduled site walk-through, and any subsequent addenda provide the description of work required in each Bid Package.

The Maintenance Shop Building will be vacated by the Owner during the construction period, however all consideration will be given to the fact that the Owner will have personnel and vehicles operating on the site during the construction period and all practical measures will be taken to accommodate the owners presence and activities in a safe manner. The Owner will be responsible for removing, handling and replacing the owner’s equipment, materials, shelving and furniture as required.

In general, the work includes some select architectural demolition, demolition related to the mechanical and electrical trades (to be performed by those trades), concrete work, minor masonry and masonry repair work, rough carpentry, joint sealants and caulking, roof patching; repairs, maintenance and up-grades to motorized overhead doors; swinging door assemblies and finish hardware; glass and glazing, storefront assemblies, infilling existing large window openings with replacement translucent panels; painting select interior spaces and painting the building exterior. The work also includes conversion of existing storage space into new offices and office related areas and adjoining restrooms.

Mechanical work includes demolition of existing HVAC systems, piping and components including boiler heat system; installing new HVAC systems and components including large ceiling mounted circulation fans and radiant heat in some of the shop areas, welding exhaust, and work related to the existing vehicle exhaust system. Mechanical work will also include installing new compressed air system components, and re-configuration of existing air piping and additional air piping.

Electrical Work includes a new electrical service to be installed to the building and removal of the two existing services; new wiring through-out the building, some (electrical) demolition, new devices, equipment hook ups, switching and addition of code required lighting.

Some Bid Packages will include Add Alternate price items. Be sure to respond to these accordingly in the Bid-Package/Bid Forms.

Asbestos contamination and lead based paint assessment is being handled separately, pre-requisite to this work. The owner is working directly with Idaho Power Company to bring the new electrical service to the building. Electrical Contractors, refer to the electrical Bid-Package/ Bid Form for more detailed information.

Work by owner includes furnishing and installing most all general lighting fixtures, replacing existing fixtures with new L.E.D. fixtures. This work is currently in progress and will be
complete prior to the start of this work. The owners light fixture replacement work does not include any exiting, emergency or egress lighting, nor any switching work or other controlling devices.

Badging will be required for all workers on site. Refer to Bid Packages for further requirements.

B. Scope of demolition and removal work is indicated on drawings and specified in Section 024100.

C. Scope of alterations work is indicated on drawings.

1.04 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

B. Utility Outages and Shutdown:
   1. Prevent accidental disruption of utility services to other facilities.

1.06 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.

B. Section 012000 - Price and Payment Procedures.

C. Section 012300 - Alternates.

D. Section 013000 - Administrative Requirements.

E. Section 014000 - Quality Requirements.

F. Section 014216 - Definitions.

G. Section 015000 - Temporary Facilities and Controls.

H. Section 016000 - Product Requirements.

I. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

J. Section 017000 - Execution and Closeout Requirements.

K. Section 017800 - Closeout Submittals.

END OF SECTION 011000
SECTION 012000 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Procedures for preparation and submittal of applications for progress payments.

1.02 RELATED REQUIREMENTS
   A. Section 005000 - Contracting Forms and Supplements: Forms to be used.
   B. Section 005200 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.
   C. Section 007200 - General Conditions and Document 007300 - Supplementary Conditions: Additional requirements for progress payments, final payment, changes in the Work.
   D. Section 007300 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.
   E. Section 012100 - Allowances: Payment procedures relating to allowances.
   F. Section 012200 - Unit Prices: Payment and modification procedures relating to unit prices.
   G. Section 017800 - Closeout Submittals: Project record documents.

1.03 SCHEDULE OF VALUES
   A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
   B. Forms filled out by hand will not be accepted.
   C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS
   A. Payment Period: Submit at intervals stipulated in the Agreement.
   B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
   C. Forms filled out by hand will not be accepted.
   D. Execute certification by signature of authorized officer.
   E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
   F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
   G. Submit one electronic and three hard-copies of each Application for Payment.

1.05 APPLICATION FOR FINAL PAYMENT
   A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
   B. Application for Final Payment will not be considered until the following have been accomplished:
      1. All closeout procedures specified in Section 017000.
      2. Completed "Release of Claims" form attached following this page.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION 012000
RELEASE OF CLAIMS

(TO BE COMPLETED FOR FINAL PAYMENT)

I, ________________________________, do hereby release the State of Idaho from any and all claims of any character whatsoever arising under and by virtue of contract number ______________________ Dated ______________________ as amended, except as herein stated.

Dated ______________________    Contractor ______________________
SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS
   A. Section 013000 - Administrative Requirements: Submittal procedures, coordination.

1.03 DEFINITIONS
   A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
      1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
         a. Unavailability.
         b. Regulatory changes.
      2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS
   A. No substitution Requests allowed after bid date except:
      1. When products are unavailable within construction schedule.
   B. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
      1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
      2. Agrees to provide the same warranty for the substitution as for the specified product.
      3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
      4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
      5. Waives claims for additional costs or time extension that may subsequently become apparent.
      6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
   C. A Substitution Request for specified installer constitutes a representation that the submitter:
      1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
   D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
   E. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
      1. No specific form is required. Contractor's Substitution Request documentation must include the following:
         a. Project Information:
            1) Official project name and number, and any additional required identifiers established in Contract Documents.
            2) Owner's, Architect's, and Contractor's names.
         b. Substitution Request Information:
            1) Indication of whether the substitution is for cause or convenience.
            2) Issue date.
3) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
4) Description of Substitution.
5) Reason why the specified item cannot be provided.
6) Differences between proposed substitution and specified item.
7) Description of how proposed substitution affects other parts of work.

c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
   1) Physical characteristics.
   2) In-service performance.
   3) Warranties.
   4) Include, as appropriate or requested, the following types of documentation:
      (a) Product Data:
      (b) Samples.
      (c) Certificates, test, reports or similar qualification data.
      (d) Drawings, when required to show impact on adjacent construction elements.

d. Impact of Substitution:
   1) Savings to Owner for accepting substitution.
   2) Change to Contract Time due to accepting substitution.

F. Limit each request to a single proposed substitution item.
   1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT
   A. Owner will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION
   A. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
   B. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
      1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
      2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
      3. Bear the costs engendered by proposed substitution of:
         a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
   C. Substitutions will not be considered under one or more of the following circumstances:
      1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
      2. Without a separate written request.
      3. When acceptance will require revisions to the Contract Documents.

3.04 RESOLUTION
   A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
   B. Architect will notify Contractor in writing of decision to accept or reject request.
      1. Architect's decision following review of proposed substitution will be noted on the submitted form.
3.05 ACCEPTANCE
   A. Accepted substitutions change the work of the Project. They will be documented and
      incorporated into work of the project by Change Order, Construction Change Directive,
      Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of
      the Contract.

3.06 CLOSEOUT ACTIVITIES
   A. See Section 017800 - Closeout Submittals, for closeout submittals.
   B. Include completed Substitution Request Forms as part of the Project record. Include both
      approved and rejected Requests.

END OF SECTION 012500
SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Preconstruction meeting.
   B. Site mobilization meeting.
   C. Progress meetings.
   D. Construction progress schedule.
   E. Contractor's daily reports.
   F. Progress photographs.
   G. Submittals for review, information, and project closeout.
   H. Number of copies of submittals.
   I. Requests for Information (RFI) procedures.
   J. Submittal procedures.

1.02 RELATED REQUIREMENTS
   A. Section 007200 - General Conditions: Duties of the Construction Manager.
   B. Section 017000 - Execution and Closeout Requirements: Additional coordination requirements.
   C. Section 017800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 REFERENCE STANDARDS

1.04 PROJECT COORDINATOR
   A. Project Coordinator: Construction Manager.
   B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for vehicular access, traffic, and parking facilities.
   C. During construction, coordinate use of site and facilities through the Project Coordinator.
   D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
   E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 011000 - Summary.
   F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
   G. Make the following types of submittals to Architect through the Project Coordinator:
      1. Requests for Information.
      2. Requests for substitution.
      3. Shop drawings, product data, and samples.
      4. Test and inspection reports.
      5. Design data.
      6. Manufacturer's instructions and field reports.
      7. Applications for payment and change order requests.
      8. Progress schedules.
      9. Coordination drawings.
      10. Correction Punch List and Final Correction Punch List for Substantial Completion.
      11. Closeout submittals.
PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION

3.01  PRECONSTRUCTION MEETING
A. Owner will schedule a time, location and date for the meeting after Notice of Award.
B. Attendance Required:
   1. Owner.
   3. Contractor.
   4. Sub-contractors.
   5. Agency Representative.
C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
   5. Submission of initial Submittal schedule.
   7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   8. Scheduling.
D. Architect is to record minutes and distribute copies within two days after meeting to participants, with two copies to Owner, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING
A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.
B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Special consultants.
   5. Contractor’s superintendent.
C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner’s requirements.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   7. Schedules.
   8. Application for payment procedures.
   9. Procedures for testing.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.
D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS
A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Special consultants.
   5. Contractor’s superintendent.

C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Maintenance of quality and work standards.
   11. Effect of proposed changes on progress schedule and coordination.
   12. Other business relating to work.

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

3.04 CONSTRUCTION PROGRESS SCHEDULE
   A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned
      operations for the first 60 days of work, with a general outline for remainder of work.
   B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
   C. Within 20 days after review of preliminary schedule, submit draft of proposed complete
      schedule for review.
      1. Include written certification that major contractors have reviewed and accepted proposed
         schedule.
   D. Within 10 days after joint review, submit complete schedule.
   E. Submit updated schedule every 30 days.

3.05 DAILY CONSTRUCTION REPORTS
   A. Include only factual information. Do not include personal remarks or opinions regarding
      operations and/or personnel.
   B. Prepare a daily construction report recording the following information concerning events at
      Project site and project progress:
      1. Date.
      2. High and low temperatures, and general weather conditions.
      3. Safety, environmental, or industrial relations incidents.
      4. Meetings and significant decisions.
      5. Stoppages, delays, shortages, and losses. Include comparison between scheduled work
         activities (in Contractor’s most recently updated and published schedule) and actual
         activities. Explain differences, if any. Note days or periods when no work was in progress
         and explain the reasons why.
      6. Testing and/or inspections performed.
      7. Signature of Contractor’s authorized representative.

3.06 PROGRESS PHOTOGRAPHS
   A. Submit new photographs at least once a month, within 3 days after being taken.
   B. Photography Type: Digital; electronic files.
C. Provide photographs of construction throughout progress of work produced by an experienced photographer, acceptable to Architect.

D. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Excavations in progress.
   2. Foundations in progress and upon completion.
   3. Structural framing in progress and upon completion.
   4. Final completion, minimum of ten (10) photos.

E. Views:
   1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
   2. Consult with Architect for instructions on views required.
   3. Provide factual presentation.
   4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

3.07 REQUESTS FOR INFORMATION (RFI)

A. Definition: A request seeking one of the following:
   1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
   2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
   1. Prepare a separate RFI for each specific item.
   2. Prepare in a format and with content acceptable to Owner.
   3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.

E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
   1. Official Project name and number, and any additional required identifiers established in Contract Documents.
   2. Owner's, Architect's, and Contractor's names.
   3. Discrete and consecutive RFI number, and descriptive subject/title.
   4. Issue date, and requested reply date.
   5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
   6. Annotations: Field dimensions and/or description of conditions which have engendered the request.

F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
   1. Indicate current status of every RFI. Update log promptly and on a regular basis.
   2. Note dates of when each request is made, and when a response is received.

H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead
to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.

2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.

3.08 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.

1. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
   a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.09 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:

   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

3.10 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

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

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in conformance to requirements of Section 017800 - Closeout Submittals:

   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.12 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Use a separate transmittal for each item.
   2. Transmit using approved form.
      a. Use Contractor's form, subject to prior approval by Architect.
   3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
   4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
      a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
   6. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
   7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
   8. Provide space for Contractor and Architect review stamps.
   9. When revised for resubmission, identify all changes made since previous submission.
10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
12. Submittals not requested will be recognized, and will be returned "Not Reviewed",

B. Product Data Procedures:
   1. Submit only information required by individual specification sections.
   2. Collect required information into a single submittal.
   3. Submit concurrently with related shop drawing submittal.
   4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
   2. Do not reproduce the Contract Documents to create shop drawings.
   3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:
   1. Transmit related items together as single package.
   2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
   3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

3.14 SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
   1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.

D. Architect's and consultants' actions on items submitted for review:
   1. Authorizing purchasing, fabrication, delivery, and installation:
      a. "Approved", or language with same legal meaning.
      b. "Approved as Noted", or language with same legal meaning.
         1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
      c. Provide copy of all "Approved" and "Approved as Noted" submittals to Owner's Field Representative immediately following approval.
   2. Not Authorizing fabrication, delivery, and installation:
      a. "Revise and Resubmit".
         1) Resubmit revised item, with review notations acknowledged and incorporated.
         2) Non-responsive resubmittals may be rejected.
      b. "Rejected".
         1) Submit item complying with requirements of Contract Documents.

E. Architect's and consultants' actions on items submitted for information:
   1. Items for which no action was taken:
      a. "Received" - to notify the Contractor that the submittal has been received for record only.
   2. Items for which action was taken:
      a. "Reviewed" - no further action is required from Contractor.

END OF SECTION 013000
SECTION 014000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.
B. Quality assurance.
C. References and standards.
D. Testing and inspection agencies and services.
E. Control of installation.
F. Manufacturers' field services.
G. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Document 007200 - General Conditions: Inspections and approvals required by public authorities.
B. Section 013000 - Administrative Requirements: Submittal procedures.
C. Section 014216 - Definitions.

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.
   2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor to Architect, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit report within 30 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
   2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications:
   1. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

1.06 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 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 minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Have Work performed by persons qualified to produce required and specified quality.
F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TESTING AND INSPECTION
A. See individual specification sections for testing and inspection required.
B. Testing Agency Duties:
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.
C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.
D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.03 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, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
3.04 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION 014000
SECTION 014216 - DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY
   A. This section supplements the definitions contained in the General Conditions.
   B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS
   A. Furnish: To supply, deliver, unload, and inspect for damage.
   B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
   C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
   D. Provide: To furnish and install.
   E. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 014216
SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Temporary utilities.
   B. Temporary sanitary facilities.
   C. Temporary Controls: Barriers.
   D. Security requirements.
   E. Vehicular access and parking.
   F. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES
   A. Owner will provide the following:
      1. Electrical power and metering, consisting of connection to existing facilities.
      2. Water supply, consisting of connection to existing facilities.
   B. Existing utilities may be used. Arrange use of temporary utilities with owner and coordinate utility charges that can be paid by the owner.
   C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TEMPORARY SANITARY FACILITIES
   A. Refer to Bid Package #2.

1.04 BARRIERS
   A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 SECURITY
   A. Coordinate with Owner's security program.

1.06 VEHICULAR ACCESS AND PARKING
   A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
   B. Coordinate access and haul routes with governing authorities and Owner.
   C. Provide and maintain access to fire hydrants, free of obstructions.
   D. Provide means of removing mud from vehicle wheels before entering streets.
   E. Designated existing on-site roads may be used for construction traffic.
   F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.07 WASTE REMOVAL
   A. Refer to Bid Packages.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 015000
SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Re-use of existing products.
B. Transportation, handling, storage and protection.
C. Product option requirements.
D. Substitution limitations.
E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Section 012500 - Substitution Procedures: Substitutions made during and after the Bidding/Negotiation Phase.
B. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
D. Section 220513 - Common Motor Requirements for Plumbing Equipment: Motors for plumbing equipment.
E. Section 230513 - Common Motor Requirements for HVAC Equipment: Motors for HVAC equipment.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.
B. DO NOT USE products having any of the following characteristics:
   1. Containing lead, cadmium, asbestos.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
B. Products Specified by Naming One or More Manufacturers: Use a product of one of the 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.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 012500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
3.04 OFF-SITE STORAGE OF MATERIALS

A. Off-Site Storage of Materials is governed by Section 9.3.2 of the General Conditions of the Contract for Construction, AIA document (A201 – 1997 ed.) as modified by the Supplementary Conditions.

1. Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage, and transportation to the site for such materials and equipment stored off the site. Off-site storage will not be approved more than 30 miles from the project site or outside of the State. Any materials stored off site and paid for by the Owner shall be physically marked as being the property of the State of Idaho.

B. Further in accordance with Section 9.3.2, the following shall apply:

1. The Contractor must provide at least thirty (30) days advance written notice of its request to store off site. Such notice must include a description of the type, quantities, locations, and values of materials involved for the next billing cycle. All invoices must indicate the type, quantities, and value of materials or equipment for which payment is requested.

2. All materials stored off-site must be segregated and clearly marked with the ITD project number and as being the “Property of the State of Idaho.”

3. The project architect and/or the ITD field representative must have unrestricted access to the stored materials during all business hours and may physically inventory all invoiced materials and may physically inspect the storage conditions.

4. The Contractor must provide written consent of surety to off-site storage of materials and equipment and to payment for such materials and equipment prior to incorporation in the Work. Consent must be of surety. Consent of local broker or agent is not acceptable.

5. The contractor must maintain and must provide to the project architect, upon request, a current log of stored materials and equipment, which reflects when materials are used or added.

6. The contractor must obtain and maintain on all materials and equipment stored off-site and in transit all risk property insurance at replacement cost, with the state of Idaho listed as loss payee.

END OF SECTION 016000
SECTION 016116 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Requirements for Indoor-Emissions-Restricted products.
B. Requirements for VOC-Content-Restricted products.

1.02  RELATED REQUIREMENTS
A. Section 014000 - Quality Requirements: Procedures for testing and certifications.
B. Section 016000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.
C. Section 079200 - Joint Sealants: Emissions-compliant sealants.

1.03  DEFINITIONS
A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings.
   2. Interior adhesives and sealants, including flooring adhesives.
   3. Flooring.
   5. Products making up wall and ceiling assemblies.
   6. Thermal and acoustical insulation.
B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Exterior and interior paints and coatings.
   2. Exterior and interior adhesives and sealants, including flooring adhesives.
   3. Wet-applied roofing and waterproofing.
   4. Other products when specifically stated in the specifications.
C. Interior of Building: Anywhere inside the exterior weather barrier.
D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.

1.04  REFERENCE STANDARDS
1.05 QUALITY ASSURANCE

A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
   1. Wet-Applied Products: State amount applied in mass per surface area.
   2. Paints and Coatings: Test tinted products, not just tinting bases.
   3. Evidence of Compliance: Acceptable types of evidence are the following:
      a. Test report showing compliance and stating exposure scenario used.
   4. Product data submittal showing VOC content is NOT acceptable evidence.
   5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.

B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.
      c. Certification by manufacturer that product complies with requirements.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
   2. Inherently Non-Emitting Materials.

C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   3. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION 016116
SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Examination, preparation, and general installation procedures.
B. Requirements for alterations work, including selective demolition.
C. Pre-installation meetings.
D. Cutting and patching.
E. Surveying for laying out the work.
F. Cleaning and protection.
G. Demonstration and instruction of Owner personnel.
H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS
A. Section 013000 - Administrative Requirements: Submittals procedures.
B. Section 014000 - Quality Requirements: Testing and inspection procedures.
C. Section 015100 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.
D. Section 017419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
E. Section 017800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
F. Section 017900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
G. Section 024100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.
C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.
D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   5. Work of Owner or separate Contractor.
EXECUTION AND CLOSEOUT REQUIREMENTS

6. Include in request:
   a. Identification of Project.
   b. Location and description of affected work.
   c. Necessity for cutting or alteration.
   d. Description of proposed work and products to be used.
   e. Effect on work of Owner or separate Contractor.
   f. Written permission of affected separate Contractor.
   g. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.

B. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities.

C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.06 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent airborne dust from dispersing into atmosphere and over adjacent property.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 6 pm to 7 am.

D. Pollution Control: 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. Comply with federal, state, and local regulations.

1.07 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new 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.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
PART 2 PRODUCTS

2.01 PATCHING MATERIALS
   A. New Materials: As specified in product sections; match existing products and work for patching
      and extending work.
   B. Type and Quality of Existing Products: Determine by inspecting and testing products where
      necessary, referring to existing work as a standard.
   C. Product Substitution: For any proposed change in materials, submit request for substitution
      described in Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work.
      Start of work means acceptance of existing conditions.
   B. Verify that 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. Take field measurements before confirming product orders or beginning fabrication, to minimize
      waste due to over-ordering or misfabrication.
   E. Verify that utility services are available, of the correct characteristics, and in the correct
      locations.
   F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements
      subject to damage or movement during cutting and patching. After uncovering existing work,
      assess conditions affecting performance of work. Beginning of cutting or patching means
      acceptance of existing conditions.

3.02 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 any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS
   A. When required in individual specification sections, convene a preinstallation meeting at the site
      prior to commencing work of the section.
   B. Attendance required of parties directly affecting, or affected by, work of the specific section
      including:
      1. Owner
      2. Architect
      3. General Contractor
      4. Subcontractor
      5. Manufacturer's Representative
   C. Notify Architect four days in advance of meeting date.
   D. Prepare agenda and preside at meeting:
      1. Review conditions of examination, preparation and installation procedures.
      2. Review coordination with related work.
   E. Record minutes and distribute copies within two days after meeting to participants, with two
      copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK
   A. Verify locations of survey control points prior to starting work.
   B. Promptly notify Architect of any discrepancies discovered.
C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and ________.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations, and ________.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Verify that abandoned services serve only abandoned facilities.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
   1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
   2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
   3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

G. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
   2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

H. Clean existing systems and equipment.
I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
J. Do not begin new construction in alterations areas before demolition is complete.
K. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING
A. Whenever possible, execute the work by methods that avoid cutting or patching.
B. See Alterations article above for additional requirements.
C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.
D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
G. Restore work with new products in accordance with requirements of Contract Documents.
H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
I. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.08 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 the space.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
D. Collect and remove waste materials, debris, and trash/rubbish from site weekly and dispose off-site; do not burn or bury.

3.09 PROTECTION OF INSTALLED WORK
A. Protect installed work from damage by construction operations.
B. Provide special protection where specified in individual specification sections.
C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
F. 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.
G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 DEMONSTRATION AND INSTRUCTION
A. See Section 017900 - Demonstration and Training.

3.11 ADJUSTING
A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING
A. Use cleaning materials that are nonhazardous.
B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
E. Clean filters of operating equipment.
F. Clean debris from roofs, gutters, downspouts, overflow drains, area drains, and drainage systems.
G. Clean site; sweep paved areas, rake clean landscaped surfaces.
H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, 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 Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 017000
PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.
B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
E. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
F. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 013000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
B. Section 015000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
C. Section 016000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
D. Section 017000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
I. Return: To give back reusable items or unused products to vendors for credit.
J. Reuse: To reuse a construction waste material in some manner on the project site.
K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
   7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.

C. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.
   3. Landfill Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
      c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
      d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   4. Incinerator Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

5. Recycled and Salvaged Materials: Include the following information for each:
a. Identification of material, including those retrieved by installer for use on other projects.
b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.

6. Material Reused on Project: Include the following information for each:
a. Identification of material and how it was used in the project.
b. Amount, in tons or cubic yards (cubic meters).
c. Include weight tickets as evidence of quantity.

7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES
A. See Section 013000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
B. See Section 015000 for additional requirements related to trash/waste collection and removal facilities and services.
C. See Section 016000 for waste prevention requirements related to delivery, storage, and handling.
D. See Section 017000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION
A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.
   4. Job safety meetings.
E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION 017419
SECTION 017800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Project Record Documents.
   B. Operation and Maintenance Data.
   C. Warranties and bonds.

1.02 RELATED REQUIREMENTS
   A. Section 007200 - General Conditions and 007300 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
   B. Section 013000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
   C. Section 017000 - Execution and Closeout Requirements: Contract closeout procedures.
   D. Individual Product Sections: Specific requirements for operation and maintenance data.
   E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS
   A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
   B. Operation and Maintenance Data:
      1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
      2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
      3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
      4. Submit two sets of revised final documents in final form within 10 days after final inspection.
   C. Warranties and Bonds:
      1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
      2. Make other submittals within 10 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 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS
   A. Maintain on site one set of the following record documents; record actual revisions to the Work:
      1. Accurate and complete "As-Built" drawings.
      2. Addenda.
      3. Change Orders and other modifications to the Contract.
   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.
   E. Record Drawings: Legibly mark each item to record actual construction including:
      1. Field changes of dimension and detail.
2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA
A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES
A. For Each Product, Applied Material, and Finish:
B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS
A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.
B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
D. 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 any special operating instructions.
E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
F. Provide servicing and lubrication schedule, and list of lubricants required.
G. Include manufacturer's printed operation and maintenance instructions.
H. Include sequence of operation by controls manufacturer.
I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
J. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS
A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.
      a. Source data.
      b. Product data, shop drawings, and other submittals.
      c. Operation and maintenance data.
      d. Field quality control data.
      e. Photocopies of warranties and bonds.
   4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

3.06 WARRANTIES AND BONDS

A. Contractor agrees that all warranties and guarantees of materials, equipment and workmanship to the Owner shall also be for the specific benefit of the Idaho State Building Authority and, specifically agrees for itself and all of its subcontractors and suppliers that any and all provisions of any warranty or guaranty may be enforced by the Owner, the Idaho State Building Authority or any of its assignees or successors in interest.

B. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

C. Verify that documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Retain warranties and bonds until time specified for submittal.

F. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION 017800
SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.
B. Training of Owner personnel in operation and maintenance is required for:
   1. All software-operated systems.
   2. HVAC systems and equipment.
   3. Plumbing equipment.
   4. Electrical systems and equipment.
   5. Items specified in individual product Sections.
C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
   1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
   2. Finishes, including flooring, wall finishes, ceiling finishes.
   3. Fixtures and fittings.
   4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

A. Section 017800 - Closeout Submittals: Operation and maintenance manuals.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Architect and Owner.
   2. Submit not less than four weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Provide an overall schedule showing all training sessions.
   5. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such as slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.
D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.
   3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
   1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
   2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.

B. Demonstration may be combined with Owner personnel training if applicable.

C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.
   2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. Owner will provide classroom and seating at no cost to Contractor.

C. Provide training in minimum two hour segments.

D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

F. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
   3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
   4. Provide hands-on training on all operational modes possible and preventative maintenance.
   5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
   6. Discuss common troubleshooting problems and solutions.
   7. Discuss any peculiarities of equipment installation or operation.
   8. Discuss warranties and guarantees, including procedures necessary to void coverage.
9. Review recommended tools and spare parts inventory suggestions of manufacturers.
10. Review spare parts and tools required to be furnished by Contractor.
11. Review spare parts suppliers and sources and procurement procedures.

G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION 017900
SECTION 024100 - DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS
   A. Section 011000 - Summary: Limitations on Contractor’s use of site and premises.
   B. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
   C. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
   D. Section 017419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 3 EXECUTION

2.01 GENERAL PROCEDURES AND PROJECT CONDITIONS
   A. Comply with other requirements specified in Section 017000.
   B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
      1. Obtain required permits.
      2. Use explosives is not permitted.
      3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
      4. Provide, erect, and maintain temporary barriers and security devices.
      5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
      6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
      7. Do not close or obstruct roadways or sidewalks without permit.
      8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   C. Do not begin removal until receipt of notification to proceed from Owner.
   D. Protect existing structures and other elements that are not to be removed.
      1. Provide bracing and shoring.
      2. Prevent movement or settlement of adjacent structures.
      3. Stop work immediately if adjacent structures appear to be in danger.
   E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
   F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB’s, and mercury.
   G. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Comply with requirements of Section 017419 - Waste Management.
2. Dismantle existing construction and separate materials.
3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

2.02 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not disrupt public utilities without permit from authority having jurisdiction.
D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

2.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.
D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

2.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of Section 017419 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 024100
SECTION 055000 - METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS
   A. Section 055213 - Pipe and Tube Railings.
   B. Section 099113 - Exterior Painting: Paint finish.
   C. Section 099123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS
   E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
   F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
      1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL
   A. Steel Sections: ASTM A36/A36M.
   B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
   C. Plates: ASTM A283/A283M.
   E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION
   A. Fit and shop assemble items in largest practical sections, for delivery to site.
   B. Fabricate items with joints tightly fitted and secured.
   C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
   D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS
   A. Bumper Posts and Guard Rails: As detailed; prime paint finish.
   B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
C. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

3.03 INSTALLATION
A. Install items plumb and level, accurately fitted, free from distortion or defects.
B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION 055000
SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.
B. Stair railings and guardrails.

1.02 REFERENCE STANDARDS

B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
E. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.
B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
D. Allow for expansion and contraction of members and building movement without damage to connections or members.
E. Dimensions: See drawings for configurations and heights.
   1. Top Rails and Wall Rails: 1-1/2 inches (38 mm) diameter, round.
   2. Intermediate Rails: 1-1/2 inches (38 mm) diameter, round.
   3. Posts: 1-1/2 inches (38 mm) diameter, round.
F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
G. Provide mechanical and welding fittings where indicated to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION
   A. Accurately form components to suit specific project conditions and for proper connection to building structure.
   B. Fit and shop assemble components in largest practical sizes for delivery to site.
   C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
   D. Welded Joints:
      1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
      2. Interior Components: Continuously seal joined pieces by continuous welds.
      3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION
   A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
   C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
   D. Anchor railings securely to structure.

3.04 TOLERANCES
   A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
   B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
   C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION 055213
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Rough opening framing for doors, windows, and roof openings.
B. Roof-mounted curbs.
C. Roofing nailers.
D. Roofing cant strips.
E. Preservative treated wood materials.
F. Miscellaneous framing and sheathing.
G. Communications and electrical room mounting boards.
H. Concealed wood blocking, nailers, and supports.
I. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS
A. Section 033000 - Cast-in-Place Concrete: Setting anchors in masonry.
B. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.
C. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS
D. PS 1 - Structural Plywood; 2009.
E. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
G. WWPA G-5 - Western Lumber Grading Rules; 2017.

1.04 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Grading Agency: Western Wood Products Association; WWPA G-5.
B. Sizes: Nominal sizes as indicated on drawings, S4S.
C. Moisture Content: S-dry or MC19.

D. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
   2. Grade: No. 2.

E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm)):
   2. Grade: No. 1 & Btr.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 STRUCTURAL COMPOSITE LUMBER

A. At Contractor's option, structural composite lumber may be substituted for concealed dimension lumber and timbers.

B. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.
   1. Columns: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 1,800,000 psi (12,410 MPa), minimum.
   2. Beams: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 1,800,000 psi (12,410 MPa), minimum.
   3. Manufacturers:

2.04 CONSTRUCTION PANELS

A. Roof Sheathing: Oriented strand board wood structural panel; PS 2.
   1. Grade: Structural 1 Sheathing.
   2. Bond Classification: Exposure 1.
   3. Performance Category: 5/8 PERF CAT.
   5. Edges: Square.

B. Wall Sheathing: Any PS 2 type.
   2. Grade: Structural I Sheathing.
   4. Performance Category: 5/16 PERF CAT.
   5. Edge Profile: Square edge.

C. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.

D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treat lumber exposed to weather.
   c. Treat lumber in contact with roofing, flashing, or waterproofing.
   d. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 PREPARATION
   A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL
   A. Select material sizes to minimize waste.
   B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
   C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION
   A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength.
   B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
   C. Install structural members full length without splices.
   D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
   E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
   F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS
   A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
   B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
   C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
   D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
   E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
   F. Provide the following specific non-structural framing and blocking:
      1. Cabinets and shelf supports.
      2. Wall brackets.
      3. Handrails.
      4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.

### 3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

### 3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.

B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws.

C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.

### 3.07 CLEANING

A. Waste Disposal: Comply with the requirements of Section 017419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.
SECTION 062000 - FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Finish carpentry items.

1.02 RELATED REQUIREMENTS
   A. Section 061000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
   B. Section 081416 - Flush Wood Doors.
   C. Section 099123 - Interior Painting: Painting and finishing of finish carpentry items.

1.03 REFERENCE STANDARDS
   B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
   B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 QUALITY ASSURANCE
   A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of experience.
      1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
   B. Quality Certification:
      1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
      2. Provide labels or certificates indicating that the work complies with AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
      3. Provide designated labels on shop drawings as required by certification program.
      4. Provide designated labels on installed products as required by certification program.
      5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect work from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS
   A. Quality Standard: Custom Grade, in accordance with AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.
   C. Interior Woodwork Items:
      1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.

2.02 WOOD-BASED COMPONENTS
   A. Wood fabricated from old growth timber is not permitted.
2.03 FABRICATION
   A. Shop assemble work for delivery to site, permitting passage through building openings.
   B. When necessary to cut and fit on site, provide materials with ample allowance for cutting.
      Provide trim for scribing and site cutting.

2.04 SHOP FINISHING
   A. Sand work smooth and set exposed nails and screws.
   B. Apply wood filler in exposed nail and screw indentations.
   C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces
      and is of type recommended for the applicable finish.
   D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 -
      Finishing for grade specified and as follows:
      1. Transparent:
         a. System - 1, Lacquer, Nitrocellulose.
         b. Stain: As selected by Architect.
         c. Sheen: Satin.
      2. Opaque:
         b. Color: As selected by Architect.
         c. Sheen: Satin.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify adequacy of backing and support framing.
   B. Verify mechanical, electrical, and building items affecting work of this section are placed and
      ready to receive this work.

3.02 INSTALLATION
   A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS)
      requirements for grade indicated.
   B. Set and secure materials and components in place, plumb and level.
   C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm).
      Do not use additional overlay trim to conceal larger gaps.

3.03 PREPARATION FOR SITE FINISHING
   A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

3.04 TOLERANCES
   A. Maximum Variation from True Position: 1/16 inch (1.6 mm).
   B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

END OF SECTION 062000
SECTION 064100 - ARCHITECTURAL WOOD CASEWORK

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Specially fabricated cabinet units.
   B. Countertops.
   C. Cabinet hardware.

1.02  RELATED REQUIREMENTS
   A. Section 061000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

1.03  REFERENCE STANDARDS
   D. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.

1.04  SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
      1. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
   C. Product Data: Provide data for hardware accessories.

1.05  QUALITY ASSURANCE
   A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
      1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
   B. Quality Certification:
      1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
      2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
      3. Provide designated labels on shop drawings as required by certification program.
      4. Provide designated labels on installed products as required by certification program.
      5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
      6. Replace, repair, or rework all work for which certification is refused.

1.06  DELIVERY, STORAGE, AND HANDLING
   A. Protect units from moisture damage.

1.07  FIELD CONDITIONS
   A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2  PRODUCTS

2.01  MANUFACTURERS
   A. Substitutions: See Section 016000 - Product Requirements.
2.02 CABINETS
   A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.03 WOOD-BASED COMPONENTS
   A. Wood fabricated from old growth timber is not permitted.

2.04 COUNTERTOPS
   A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded.

2.05 HARDWARE
   A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
   B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards and coordinated self rests, satin chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
   C. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers ("U" shaped wire pull, steel with satin finish, 100 mm centers).
   D. Drawer Slides:
      1. Type: Standard extension.
      2. Static Load Capacity: Commercial grade.
   E. Hinges: Concealed (fully mortised) self-closing type, steel with satin finish.

2.06 FABRICATION
   A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

2.07 SHOP FINISHING
   A. Sand work smooth and set exposed nails and screws.
   B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
   C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify adequacy of backing and support framing.
   B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION
   A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
   B. Use fixture attachments in concealed locations for wall mounted components.
   C. Use concealed joint fasteners to align and secure adjoining cabinet units.
   D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.
   E. Secure cabinets to floor using appropriate angles and anchorages.
   F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING
   A. Adjust installed work.
3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION 064100
SECTION 072100 - THERMAL INSULATION

PART 1 GENERAL

1.01 REFERENCE STANDARDS


1.02 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

PART 2 PRODUCTS

2.01 FOAM BOARD INSULATION MATERIALS

A. Expanded Polystyrene (EPS) Board Insulation: Complies with ASTM C578.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Complies with fire resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
   4. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
   6. Type and Thermal Resistance, R-value (RSI-value): Type XI, 3.1 (0.55) per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.

B. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88) per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
   5. Complies with fire resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
   6. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.

2.02 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
   5. Manufacturers:
c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.

d. Substitutions: See Section 016000 - Product Requirements.

2.03 ACCESSORIES
A. Sheet Vapor Retarder: Black polyethylene film for above grade application, 10 mil, 0.010 inch (0.25 mm) thick.
B. Interior Vapor Retarder: Modified polyethylene/polyacrylate (PE/PA) film reinforced with polyethylene terephthalate (PET) fibers, 12 mils, 0.012 inch (0.30 mm) thick.
   1. Width: 4.9 feet (1.5 m).
C. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.
   3. Temperature Resistance: Minus 40 degrees F to 212 degrees F (Minus 40 degrees C to 100 degrees C)

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
B. Verify substrate surfaces are flat, free of irregularities or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT CAVITY WALLS
A. Install boards to fit snugly between wall ties.
B. Install boards horizontally on walls.
C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK
A. Board Installation Over Roof Deck, General:
   1. See applicable roofing specification section for specific board installation requirements.
   2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
   3. Do not apply more insulation than can be covered with roofing in same day.

3.04 BATT INSTALLATION
A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
D. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches (150 mm) on center. Lap and seal sheet retarder joints over member face.
E. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
F. Tape seal tears or cuts in vapor retarder.
G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

3.05 PROTECTION
A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 072100
SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.
B. Sealants for joints within sheet metal fabrications.
C. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Wood nailers for sheet metal work.
B. Section 077200 - Roof Accessories: Manufactured metal roof curbs.
C. Section 079200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS


1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) (0.61 mm) thick base metal.
B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch (0.61 mm) thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's standard colors.

2.02 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
B. Form pieces in longest possible lengths.
C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

2.03 GUTTER AND DOWNSPOUT FABRICATION
A. Gutters: Profile as indicated - match existing.
B. Downspouts: Profile as indicated - match existing.
C. Accessories: Profiled to suit gutters and downspouts.
   1. Anchorage Devices: Match existing.
   2. Gutter Supports: Match existing.
   3. Downspout Supports: Match existing.
D. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.
E. Seal metal joints.

2.04 ACCESSORIES
A. Fasteners: Galvanized steel, with soft neoprene washers.
B. Primer: Zinc chromate type.
C. Concealed Sealants: Non-curing butyl sealant.
D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
E. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 INSTALLATION
A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
B. Apply plastic cement compound between metal flashings and felt flashings.
C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
D. Seal metal joints watertight.
E. Set splash pads under downspouts.

3.03 FIELD QUALITY CONTROL
A. See Section 014000 - Quality Requirements, for field inspection requirements.
B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION 076200
SECTION 077200 - ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Curbs.
B. Equipment rails.
C. Roof penetrations mounting curbs.

1.02 RELATED REQUIREMENTS
A. Section 076200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.
C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
D. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner’s name and registered with manufacturer.
   3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store products under cover and elevated above grade.

1.06 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion.
C. Provide five year manufacturer warranty for Curbs, rails and supports.

PART 2 PRODUCTS

2.01 ROOF CURBS
A. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
   1. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings.
   2. Roof Curb Mounting Substrate: Curb substrate consists of flat roof deck sheathing with insulation.
   3. Sheet Metal Material:
      a. Aluminum: 0.080 inch (2.03 mm) minimum thickness, with 3003 alloy, and H14 temper.
4. Provide for layouts and configurations as indicated on drawings.

B. Curbs at Roof Openings: Provide curb at sides of roof opening, with top of curb horizontal and level for equipment mounting.
   1. Provide preservative treated wood nailers along top of curb.
   2. Insulate inside curbs with 1-1/2 inch (38 mm) thick fiberglass insulation.
   3. Height Above Roof Deck: 14 inches (356 mm), minimum.

C. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
   1. Provide preservative treated wood nailers along top of rails.
   2. Height Above Roof Deck: 14 inches (356 mm), minimum.

D. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches (400 mm) square unless otherwise indicated.
   1. Provide sliding channel welded along top edge with adjustable height steel bracket, fabricated to fit item supported.
   2. Height Above Finished Roof Surface: 8 inches (203 mm), minimum.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Do not begin installation until substrates have been properly prepared.
   B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION
   A. Clean surfaces thoroughly prior to installation.
   B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION
   A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING
   A. Clean installed work to like-new condition.

3.05 PROTECTION
   A. Protect installed products until completion of project.
   B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 077200
SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Nonsag gunnable joint sealants.
   B. Self-leveling pourable joint sealants.
   C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS
   A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
      1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
      2. List of backing materials approved for use with the specific product.
      3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
      4. Substrates the product should not be used on.
      5. Substrates for which use of primer is required.
      6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.05 QUALITY ASSURANCE
   A. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS
   A. Scope:
      1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
         a. Wall expansion and control joints.
         b. Joints between door, window, and other frames and adjacent construction.
         c. Joints between different exposed materials.
         d. Openings below ledge angles in masonry.
e. Other joints indicated below.

2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Other joints indicated below.

3. Do not seal the following types of joints.
   a. Intentional weepholes in masonry.
   b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
   c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
   d. Joints where installation of sealant is specified in another section.
   e. Joints between suspended panel ceilings/grid and walls.

B. Type 1 - Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.

C. Type 3 - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
   1. Type 4 - Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
   2. Type 2 - Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
   3. Type _____ - Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
   4. Type _____ - Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.

D. Interior Wet Areas: restrooms; fixtures in wet areas include plumbing fixtures, countertops, and other similar items.

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 016116.

2.03 NONSAG JOINT SEALANTS

A. Type 1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   4. Color: To be selected by Architect from manufacturer's standard range.
   5. Manufacturers:
      f. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosanetals.com/#sle.
      g. Tremco Commercial Sealants & Waterproofing; Spectrem 2: www.tremcosanetals.com/#sle.
      h. Tremco Commercial Sealants & Waterproofing; Spectrem 3: www.tremcosanetals.com/#sle.
      i. Substitutions: See Section 016000 - Product Requirements.
B. Type 2 - Mildew-Resistant Silicone Sealant:  ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   2. Manufacturers:
      b. Substitutions: See Section 016000 - Product Requirements.

C. Type 3 - Polyurethane Sealant:  ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   2. Color: To be selected by Architect from manufacturer’s standard range.
   3. Manufacturers:
      a. The QUIKRETE Companies; QUIKRETE® Polyurethane Non-Sag Sealant:
         www.quikrete.com/#sle.
      d. Sika Corporation; Sikaflex-2c NS:  www.usa-sika.com/#sle.
      e. Tremco Commercial Sealants & Waterproofing; Dymonic 100:
         www.tremcosealants.com/#sle.
      f. Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC:
         www.tremcosealants.com/#sle.
      h. Substitutions: See Section 016000 - Product Requirements.

D. Type 4 - Acrylic Emulsion Latex:  Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
   1. Color: Standard colors matching finished surfaces, Type OP (opaque).
   2. Manufacturers:
      a. Franklin International, Inc; Titebond GREENchoice Acoustical Smoke & Sound
         Sealant:  www.titebond.com/#sle.
      b. Tremco Commercial Sealants & Waterproofing; Tremflex 834:
         www.tremcosealants.com/#sle.
      c. Tremco Commercial Sealants & Waterproofing; Tremstop Smoke & Sound:
         www.tremcosealants.com/#sle.
      d. Substitutions: See Section 016000 - Product Requirements.

2.04 SELF-LEVELING SEALANTS

A. Type 5 - Self-Leveling Polyurethane Sealant for Continuous Water Immersion:  Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
   2. Color: Gray.
   3. Manufacturers:
      d. Substitutions: See Section 016000 - Product Requirements.

B. Type 6 - Semi-Rigid Self-Leveling Epoxy Joint Filler:  Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
   1. Composition: Multi-component, 100 percent solids by weight.
   2. Hardness: Minimum of 85 (Shore A) or 35 (Shore D), when tested in accordance with ASTM D2240 after 7 days.
   3. Color: Concrete gray.
   4. Joint Width, Minimum: 1/8 inch (3 mm).
5. Joint Width, Maximum: 1/4 inch (6 mm).
6. Joint Depth: Provide product suitable for joints from 1/8 inch (3 mm) to 2 inches (51 mm) in depth including space for backer rod.
7. Manufacturers:
   b. Nox-Crete; DynaFlex 502: www.nox-crete.com/#sle
   d. Substitutions: See Section 016000 - Product Requirements.

2.05 ACCESSORIES
A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
   2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
   3. Open Cell: 40 to 50 percent larger in diameter than joint width.
   4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
C. Masking Tape: Self-adhesive, non-absorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that joints are ready to receive work.
B. Verify that backing materials are compatible with sealants.
C. Verify that backer rods are of the correct size.

3.02 PREPARATION
A. Remove loose materials and foreign matter that could impair adhesion of sealant.
B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION
A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
B. Perform installation in accordance with ASTM C1193.
C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
D. Install bond breaker backing tape where backer rod cannot be used.
E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION 079200
SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.
B. Hollow metal frames for wood doors.
C. Fire-rated hollow metal doors and frames.
D. Thermally insulated hollow metal doors with frames.

1.02  RELATED REQUIREMENTS

A. Section 087100 - Door Hardware.
B. Section 088000 - Glazing: Glass for doors and borrowed lites.
C. Section 099113 - Exterior Painting: Field painting.
D. Section 099123 - Interior Painting: Field painting.

1.03  ABBREVIATIONS AND ACRONYMS

B. ASCE - American Society of Civil Engineers.
C. HMMA - Hollow Metal Manufacturers Association.
D. NAAMM - National Association of Architectural Metal Manufacturers.
F. SDI - Steel Door Institute.
G. UL - Underwriters Laboratories.

1.04  REFERENCE STANDARDS

C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
K. ITS (DIR) - Directory of Listed Products; current edition.
M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
Q. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.
S. UL (DIR) - Online Certifications Directory; Current Edition.

1.05 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
D. Manufacturer's Qualification Statement.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: www.steeldoor.org/sdicertified.php.
B. Maintain at project site copies of reference standards relating to installation of products specified.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Hollow Metal Doors and Frames:

2.02 DESIGN CRITERIA
A. Requirements for Hollow Metal Doors and Frames:
   1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Door Top Closures: Flush end closure channel, with top and door faces aligned.
   4. Door Edge Profile: Manufacturers standard for application indicated.
5. Typical Door Face Sheets: Flush.
7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Hollow Metal Panels: Same construction, performance, and finish as doors.

C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Exterior Doors: Thermally insulated.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
      e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
   2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
   3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
   4. Weatherstripping: Refer to Section 087100.

C. Interior Doors, Non-Fire Rated:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
   2. Door Thickness: 1-3/4 inch (44.5 mm), nominal.

D. Fire-Rated Doors:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
      e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
   2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
   3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
   4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
      a. Attach fire rating label to each fire rated unit.
   5. Smoke and Draft Control Doors: Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
c. Label: Include the "S" label on fire-rating label of door.

6. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
7. Door Thickness: 1-3/4 inch (44.5 mm), nominal.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
B. Exterior Door Frames: Full profile/continuously welded type.
   1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
   2. Frame Finish: Factory primed and field finished.
   3. Weatherstripping: Separate, see Section 087100.
C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
   2. Frame Finish: Factory primed and field finished.
D. Door Frames, Fire-Rated: Full profile/continuously welded type.
   1. Fire Rating: Same as door, labeled.
   2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
   3. Frame Finish: Factory primed and field finished.
E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
F. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch (102 mm) high to fill opening without cutting masonry units.
G. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

A. Louvers: Roll formed steel with overlapping frame; finish same as door components; factory-installed.
   1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
B. Glazing: As specified in Section 088000, factory installed.
C. Astragals for Double Doors: Specified in Section 087100.
D. Grout for Frames: Portland cement grout with maximum 4 inch (102 mm) slump for hand troweling; thinner pumpable grout is prohibited.
E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that opening sizes and tolerances are acceptable.
C. Verify that finished walls are in plane to ensure proper door alignment.
3.02 PREPARATION
   A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION
   A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
   B. Install fire rated units in accordance with NFPA 80.
   C. Coordinate frame anchor placement with wall construction.
   D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
   E. Install door hardware as specified in Section 087100.
      1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
   F. Comply with glazing installation requirements of Section 088000.
   G. Coordinate installation of electrical connections to electrical hardware items.

3.04 TOLERANCES
   A. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.05 ADJUSTING
   A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE
   A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION 081113
SECTION 081416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Flush wood doors; flush and flush glazed configuration; non-rated.

1.02 RELATED REQUIREMENTS
   A. Section 081113 - Hollow Metal Doors and Frames.
   B. Section 087100 - Door Hardware.
   C. Section 088000 - Glazing.

1.03 REFERENCE STANDARDS
   B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
   C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
   D. Samples: Submit two samples of door veneer, 6 by 6 inch (152.4 by 152.5 mm) in size illustrating wood grain, stain color, and sheen.
   E. Warranty, executed in Owner's name.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Package, deliver and store doors in accordance with specified quality standard.
   B. Accept doors on site in manufacturer's packaging. Inspect for damage.
   C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.06 WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
   C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Wood Veneer Faced Doors:

2.02 DOORS AND PANELS
   A. Doors: Refer to drawings for locations and additional requirements.
      1. Quality Standard: Premium Grade, Standard Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
      2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
   B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
      1. Provide solid core doors at each location.
2. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES
A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS
A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match for spliced veneer leaves assembled on door or panel face.
  1. Vertical Edges: Any option allowed by quality standard for grade.

2.05 DOOR CONSTRUCTION
A. Fabricate doors in accordance with door quality standard specified.
B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
F. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS
A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Sheen: Flat.

2.07 ACCESSORIES
A. Hollow Metal Door Frames: As specified in Section 081113.
B. Glazed Openings:
   1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
C. Door Hardware: As specified in Section 087100.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify existing conditions before starting work.
B. Verify that opening sizes and tolerances are acceptable.
C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION
A. Install doors in accordance with manufacturer's instructions and specified quality standard.
B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
C. Use machine tools to cut or drill for hardware.
D. Coordinate installation of doors with installation of frames and hardware.

3.03 ADJUSTING
A. Adjust doors for smooth and balanced door movement.
B. Adjust closers for full closure.

END OF SECTION 081416
SECTION 083323 - OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead coiling doors, operating hardware, non-fire-rated and exterior, manual and electric operation.
B. Wiring from electric circuit disconnect to operator to control station.

1.02 RELATED REQUIREMENTS

A. Section 099113 - Exterior Painting: Field paint finish.

1.03 REFERENCE STANDARDS

B. ITS (DIR) - Directory of Listed Products; current edition.
C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
E. NEMA MG 1 - Motors and Generators; 2017.
F. UL (DIR) - Online Certifications Directory; Current Edition.
G. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide general construction, electrical equipment, and component connections and details.
C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 COILING DOORS

A. Exterior Coiling Doors: Steel slat curtain.
   1. Capable of withstanding positive and negative wind loads of 20 psf (940 Pa), without undue deflection or damage to components.
   2. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 7.5 (RSI-value of 1.32).
   3. Nominal Slat Size: 3 inches (75 mm) wide x required length.
   5. Hood Enclosure: Manufacturer's standard; galvanized steel.
   7. Locking Devices: Lock and latch handle on outside.

B. Non-Fire-Rated Interior Coiling Doors: Steel slat curtain.

2.02 MATERIALS

A. Curtain Construction: Interlocking slats.
1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
3. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.

B. Steel Slats: Minimum thickness, 22 gage, 0.0299 inch (0.76 mm); ASTM A653/A653M galvanized steel sheet.

C. Guide Construction: Continuous, of profile to retain door in place, mounting brackets of same metal.

D. Hood Enclosure: Internally reinforced to maintain rigidity and shape.

E. Lock Hardware:
   1. For motor operated units, additional lock or latching mechanisms are not required.
   2. Latch Handle: Manufacturer's standard.

F. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

2.03 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
   1. Provide interlock switches on motor operated units.

B. Electric Operators:
   1. Mounting: Side mounted.
   2. Motor Enclosure:
      a. Interior Doors: NEMA MG 1, Type 1; open drip proof.
   3. Motor Rating: 1/3 hp (250 W); continuous duty.
   5. Controller Enclosure: NEMA 250, Type 1.
   6. Opening Speed: 12 inches per second (300 mm/s).

C. Control Station: Standard three button (OPEN-STOP-CLOSE) momentary control for each operator.
   1. 24 volt circuit.

D. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.
B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
E. Coordinate installation of electrical service.
F. Complete wiring from disconnect to unit components.

3.03 ADJUSTING
   A. Adjust operating assemblies for smooth and noiseless operation.

3.04 CLEANING
   A. Clean installed components.
   B. Remove labels and visible markings.

END OF SECTION 083323
SECTION 083613 - SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Overhead sectional doors, manually and electrically operated.
B. Operating hardware and supports.
C. Electrical controls.

1.02 RELATED REQUIREMENTS
A. Section 099113 - Exterior Painting: Finish painting.

1.03 REFERENCE STANDARDS
C. NEMA MG 1 - Motors and Generators; 2017.
D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
E. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Show component construction, anchorage method, and hardware.
C. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
D. Operation Data: Include normal operation, troubleshooting, and adjusting.
E. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of experience.
B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
C. Conform to applicable code for motor and motor control requirements.
D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified.

1.06 WARRANTY
A. See Section 017800 - Closeout Submittals for warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion.
C. Warranty: Include coverage for electric motor and transmission.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Sectional Doors:
2. Substitutions: See Section 016000 - Product Requirements.

2.02 STEEL DOOR COMPONENTS

A. Steel Doors: Flush steel, insulated; vertical lift, highlift and standard lift operating styles with track and hardware (lift type to match door to be replaced); complying with DASMA 102, Commercial application.
   1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
   2. Door Nominal Thickness: 2 inches (51 mm) thick.
   3. Thermal Resistance: R-value (RSI-value) of 17.5 (0.057), minimum, for overall thickness indicated.
   4. Exterior Finish: Unfinished; field finished as indicated in Section 099113.
   5. Interior Finish: Factory finished with standard factory finish; color as selected from manufacturers standard line.
   6. Glazed Lights: four glazed lights per panel, two rows; set in place with resilient glazing channel.

B. Door Panels: Steel construction; outer steel sheet of 20 gage, 0.0359 inch (0.91 mm) minimum thickness, flush profile; inner steel sheet of 20 gage, 0.0359 inch (0.91 mm) minimum thickness, flat profile; core reinforcement sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.

C. Window Frame: Manufacturers standard, finish to match.

D. Glazing: Fully tempered glass; single pane; clear; 1/2 inch (12.7 mm) thick.

2.03 DOOR COMPONENTS

A. Pass Door: Manufacturers standard, finish to match.

B. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.

C. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.

D. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.

E. Head Weatherstripping: EPDM rubber seal, one piece full length.

F. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.

G. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

2.04 ELECTRICAL OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by a testing agency acceptable to authorities having jurisdiction.

B. Electrical Characteristics:
   1. Horsepower rating as required by manufacturer; manually operable in case of power failure, transit speed of 12 inches (300 mm) per second.

C. Motor: NEMA MG 1, Type 4.

D. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

E. Disconnect Switch: Factory mount disconnect switch in control panel.
F. Electric Operator: Center mounted on cross head shaft or side mounted as existing conditions require, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.

G. Safety Edge: At bottom of door panel, full width; electro-mechanical sensitized type, wired to stop door upon striking object; hollow neoprene covered to provide weatherstrip seal.

H. Control Station: Standard three button (open-close-stop) momentary type control for each electric operator.
   1. 24 volt circuit.
   2. Surface mounted.
   3. Locate at inside door jamb.

I. Loop Detector and Treadle:

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
   B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION
   A. Install door unit assembly in accordance with manufacturer's instructions.
   B. Anchor assembly to wall construction and building framing without distortion or stress.
   C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
   D. Fit and align door assembly including hardware.
   E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.03 ADJUSTING
   A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.04 CLEANING
   A. Clean doors and frames and glazing.
   B. Remove temporary labels and visible markings.

3.05 PROTECTION
   A. Protect installed products from damage until Date of Substantial Completion.
   B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION 083613
SECTION 084227 - FRAMELESS SLIDING GLASS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Frameless sliding glass doors.
B. Fittings, hardware, and accessories.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's descriptive data and performance characteristics.

1.04 DELIVERY, STORAGE, AND HANDLING
A. Deliver products to project site and store in manufacturer's protective cartons until openings are ready for door installation.
B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

PART 2 PRODUCTS

2.01 MANUFACTURER
A. Acceptable Manufacturer; Klein Sliding Door Systems: www.klein-usa.com
   1. Phone: Toll Free (973) 246-8181

2.02 FRAMELESS SLIDING GLASS DOOR ASSEMBLIES
A. Frameless Sliding Glass Doors; Klein Sliding Door Systems; Rollglass Self, frameless style, clear glass with track system, hardware, and accessories: www.klein-usa.com.

2.03 MATERIALS
A. Glass:
   1. Tempered Glass: Annealed flat glass meeting requirements of ASTM C1036, Type 1-Transparent Flat, Class 1-Clear, Quality Q3, and fully tempered in accordance with ASTM C1048, Kind FT, 3/8 inch (9.5 mm) thick, with eased and polished edges.
B. Regulatory Requirements:
   1. Provide tempered or laminated safety glass for locations subject to human impact as required by applicable codes.
   2. Accessibility: Comply with ADA Standards applicable to doors and hardware.
C. Fasteners: Comply with manufacturer's written recommendations.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions and approved shop drawings.
B. Install components plumb and level, in proper plane, free from warp and twist.
C. Tolerances:
1. Maximum Variation from Plumb or Level: 1/8 inch (3 mm) in 3 feet (0.9 m) or 1/4 inch (6 mm) in 10 feet (3.05 m)
2. Maximum misalignment of members abutting end-to-end: 1/16 (1.5mm).
D. Install glass and accessories in accordance with GANA (GM) Glazing Manual.

3.02 ADJUSTING
A. Adjust doors to operate correctly, without binding to frame, sill or adjacent doors.
B. Adjust door hardware for smooth operation.

3.03 CLEANING
A. Clean materials installed as part of this work thoroughly prior to Date of Substantial Completion.
B. Touch up minor scratches and abrasions to match original finish.

3.04 PROTECTION
A. Protect installed products on project until Date of Substantial Completion.

END OF SECTION 084227
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Aluminum-framed storefront, with vision glass.

1.02 RELATED REQUIREMENTS
   A. Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS
   A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.
   C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
   D. Samples: Submit two samples 8 by 8 inches (203.2 by 203.2 mm) in size illustrating finished aluminum surface, glass, glazing materials.

1.06 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
   B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Handle products of this section in accordance with AAMA CW-10.
   B. Protect finished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING
   A. Center-Set Style, Thermally-Broken:
      2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).
2.02 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Rabbet: For 1 inch (25 mm) insulating glazing.
   2. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   3. Finish Color: Dark bronze.
   4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

2.03 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   2. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Glazing: As specified in Section 088000.

2.04 MATERIALS

C. Fasteners: Stainless steel.
D. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.
E. Concealed Flashings: Galvanized steel, 26 gage, 0.0179 inch (0.45 mm) minimum base metal thickness.
F. Concealed Flashings: Sheet aluminum, 26 gage, 0.017 inch (0.43 mm) minimum thickness.
G. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
I. Glazing Accessories: As specified in Section 088000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.
B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
3.02 INSTALLATION
   A. Install wall system in accordance with manufacturer's instructions.
   B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
   C. Provide alignment attachments and shims to permanently fasten system to building structure.
   D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.
   E. Provide thermal isolation where components penetrate or disrupt building insulation.
   F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
   G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
   H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
   I. Install glass and infill panels in accordance with Section 088000, using glazing method required to achieve performance criteria.
   J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 CLEANING
   A. Remove protective material from pre-finished aluminum surfaces.
   B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

3.04 PROTECTION
   A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 084313
SECTION 084500 - TRANSLUCENT WALL AND ROOF ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Supported aluminum framed vertical glazing system.
   B. Sandwich panels of translucent skins separated with an aluminum grid.

1.02 RELATED REQUIREMENTS
   A. Section 079200 - Joint Sealants: Sealing joints between perimeter frame and adjacent construction.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, panel configuration, internal drainage details.
   C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
   D. Samples: Submit two _________, 12 by 12 inch (304.8 by 304.8 mm) minimum in size, illustrating prefinished aluminum surface, specified panel with skins, glazing materials illustrating edge and corner.
   E. Design Data: Show structural and physical characteristics, engineering calculations, and dimensional limitations.
   F. Test Reports: Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.
   G. Installation Data: Special installation requirements.

1.06 QUALITY ASSURANCE
   A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
   B. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Protect prefinished aluminum surfaces with wrapping; do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
      1. Puncture wrappings at ends for ventilation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
1. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.

B. System Design: Design and size components to withstand dead loads and live loads caused by snow, hail, and positive and negative wind loads acting on plane of panel without damage or permanent set.
   1. Design Loads: Calculate in accordance with applicable code.
   2. Measure performance in accordance with ASTM E330/E330M, using test load of 1.5 times the design wind pressure and 10 second duration of maximum load.

C. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable code.

2.03 MATERIALS


B. Fasteners: Stainless steel.

2.04 COMPONENTS

A. Panels: Bonded to both sides of structural extruded aluminum grid of pattern as shown on drawings; exposed surfaces of exterior sheet chemically and permanently treated to protect against surface erosion and extreme weather conditions.
   1. Color as selected by Architect.

B. Sealant for Within Translucent Assembly: As required by manufacturer.

C. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, and compatible with flashing material.

2.05 FABRICATION

A. Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, and ensure proper installation and dynamic movement of perimeter seals.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Locate fasteners and attachments to ensure concealment from view.

D. Reinforce framing members for external imposed loads.

2.06 FINISHES

A. Color: To be selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

3.02 INSTALLATION

A. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

B. Provide alignment attachments and shims to permanently fasten system to building structure.

C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances.

D. Install sill flashings.

3.03 FIELD QUALITY CONTROL

A. Provide the services of the manufacturer's field representative to observe installation and make report.
3.04 CLEANING
   A. Remove protective material from prefinished aluminum surfaces.
   B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean
      wiping cloths; remove dirt from corners and wipe surfaces clean.

3.05 PROTECTION
   A. Protect finished work from damage until Date of Substantial Completion.

END OF SECTION 084500
PART 1  GENERAL

1.01  SECTION INCLUDES
A. Hardware for wood, aluminum, hollow metal, and _____ doors.
B. Hardware for fire-rated doors.
C. Lock cylinders for doors that hardware is specified in other sections.
D. Thresholds.
E. Weatherstripping and gasketing.

1.02  RELATED REQUIREMENTS
A. Section 081113 - Hollow Metal Doors and Frames.
B. Section 081416 - Flush Wood Doors.
C. Section 084313 - Aluminum-Framed Storefronts: Door hardware, except as noted in section.

1.03  REFERENCE STANDARDS
B. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.
D. BHMA A156.3 - American National Standard for Exit Devices; 2014.
E. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
F. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.
I. BHMA A156.21 - American National Standard for Thresholds; 2014.
L. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
Q. UL (DIR) - Online Certifications Directory; Current Edition.

1.04  ADMINISTRATIVE REQUIREMENTS
A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

1.05  SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
   1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
   2. List groups and suffixes in proper sequence.
   3. Provide complete description for each door listed.
   4. Provide manufacturer's and product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
   5. Include account of abbreviations and symbols used in schedule.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR) or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.
   7. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
   8. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.

D. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
   2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
      a. Self-drilling (Tek) type screws are not permitted.
   3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
      a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
      b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 HINGES

A. Manufacturers:

B. Hinges: Complying with BHMA A156.1, Grade 1.
   1. Butt Hinges: Complying with BHMA A156.1 and BHMA A156.7 for templated hinges.
      a. Provide hinge width required to clear surrounding trim.
   2. Provide hinges on every swinging door.
   3. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   4. Provide ball-bearing hinges at each door.
   5. Provide non-removable pins on exterior outswinging doors.
   6. Provide power transfer hinges where electrified hardware is mounted in door leaf.
   7. Provide following quantity of butt hinges for each door:
      a. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
      b. Doors 90 inches (2.3 m) High up to 120 inches (3 m) High: Four hinges.

2.03 EXIT DEVICES

A. Manufacturers:
   1. Corbin Russwin, Sargent, or Yale; an Assa Abloy Group company; _____: www.assaabloydss.com.

B. Exit Devices: Complying with BHMA A156.3, Grade 1.
   1. Lever design to match lockset trim.
   2. Provide cylinder with cylinder dogging or locking trim.
   3. Provide exit devices properly sized for door width and height.
   4. Provide strike as recommended by manufacturer for application indicated.
   5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.04 LOCK CYLINDERS

A. Manufacturers:
   1. Best, dormakaba Group; _____: www.bestaccess.com/#sle.

B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
   1. Provide cylinders from same manufacturer as locking device.
   2. Provide cams and/or tailpieces as required for locking devices.

2.05 CYLINDRICAL LOCKS

A. Manufacturers:
   1. Corbin Russwin, Sargent, or Yale; an Assa Abloy Group company; _____: www.assaabloydss.com.
   2. Best, dormakaba Group; _____: www.bestaccess.com/#sle.

B. Cylindrical Locks (Bored): Complying with BHMA A156.2, Grade 1, 4000 Series.
   1. Bored Hole: 2-1/8 inch (54 mm) diameter.
   2. Latchbolt Throw: 1/2 inch (12.7 mm), minimum.
   3. Backset: 2-3/4 inch (70 mm) unless otherwise indicated.
   4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
a. Finish: To match lock or latch.
5. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.

2.06 DOOR PULLS AND PUSH PLATES
A. Manufacturers:
B. Door Pulls and Push Plates: Complying with BHMA A156.6.
1. Pull Type: Straight, unless otherwise indicated.
2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
   a. Edges: Beveled, unless otherwise indicated.
3. Material: Aluminum, unless otherwise indicated.
4. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
5. On glazed storefront doors, provide push bar width of door with pull handle unless otherwise indicated.

2.07 DOOR PULLS AND PUSH BARS
A. Manufacturers:
B. Door Pulls and Push Bars: Complying with BHMA A156.6.
1. Bar Type: Push bar, unless otherwise indicated.
2. Material: Aluminum, unless otherwise indicated.

2.08 COORDINATORS
A. Manufacturers:
2. DORMA USA, Inc; TS93 GSR: www.dorma.com/#sle.
3. Ives, an Allegion brand; _____: www.allegion.com/us.
B. Coordinators: Provide on doors having closers and self-latching or automatic flush bolts to ensure that inactive door leaf closes before active door leaf.
1. Type: Universal, unless otherwise indicated.
2. Material: Aluminum, unless otherwise indicated.
3. Ensure that coordination of other door hardware affected by placement of coordinators and carry bar is applied properly for completely operable installation.

2.09 CLOSERS
A. Manufacturers; Surface Mounted:
1. Corbin Russwin, Norton, Rixson, Sargent, or Yale; an Assa Abloy Group company;
3. DORMA USA, Inc; 7400 Series, 8600 Series, 8900 Series, and TS93:
   www.dorma.com/#sle.
5. LCN, an Allegion brand; _____: www.allegion.com/us.
B. Closers: Complying with BHMA A156.4, Grade 1.
1. Type: Surface mounted to door.
2. Provide door closer on each exterior door.
2.10 ASTRAGALS
A. Manufacturers:
B. Astragals: Complying with BHMA A156.22.
1. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.
2. Type: Split, two parts, and with sealing gasket.
3. Material: Aluminum, with neoprene weatherstripping.
4. Provide non-corroding fasteners at exterior locations.

2.11 THRESHOLDS
A. Manufacturers:
B. Thresholds: Complying with BHMA A156.21.
1. Provide threshold at interior doors for transition between two different floor types, unless otherwise indicated.
2. Provide threshold at each exterior door, unless otherwise indicated.
3. Type: Flat surface.
5. Threshold Surface: Fluted horizontal grooves across full width.
6. Field cut threshold to profile of frame and width of door sill for tight fit.
7. Provide non-corroding fasteners at exterior locations.

2.12 WEATHERSTRIPPING AND GASKETING
A. Weatherstripping and Gasketing: Complying with BHMA A156.22.
1. Head and Jamb Type: Adjustable.
2. Door Sweep Type: Encased in retainer.
3. Material: Aluminum, with brush weatherstripping.
4. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated.
5. Provide door bottom sweep on each exterior door, unless otherwise indicated.

2.13 FINISHES
A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
1. Primary Finish: 630; satin stainless steel, with stainless steel 3000 series base material (former US equivalent US32D); BHMA A156.18.
2. Secondary Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
   a. Use secondary finish in kitchens, bathrooms, and other spaces containing chrome or stainless steel finished appliances, fittings, and equipment; provide primary finish on one side of door and secondary finish on other side if necessary.
3. Exceptions:
   a. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.
   c. Door Closer Covers and Arms: Color as selected by Architect from manufacturer's standard colors unless otherwise indicated.
   d. Hardware for Aluminum Storefront Doors: Finished to match door panel finish, except at hand contact surfaces provide stainless steel with satin finish, unless otherwise indicated.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
   B. Verify that electric power is available to power operated devices and of correct characteristics.

3.02 INSTALLATION
   A. Install hardware in accordance with manufacturer's instructions and applicable codes.
   B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
   C. Use templates provided by hardware item manufacturer.
   D. Do not install surface mounted items until application of finishes to substrate are fully completed.
   E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
      1. For Steel Doors and Frames: Refer to Section 081113.
      2. For Aluminum-Framed Storefront Doors and Frames: Refer to Section 084313.
      3. Flush Wood Doors: Refer to Section 081416.
      4. Mounting heights in compliance with ADA Standards:
   F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING
   A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.
   B. Adjust hardware for smooth operation.
   C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING
   A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
   B. Clean adjacent surfaces soiled by hardware installation.
   C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

END OF SECTION 087100
SECTION 088000 - GLAZING

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Insulating glass units.
   B. Glazing units.
   C. Glazing compounds and accessories.

1.02  RELATED REQUIREMENTS
   A. Section 079200 - Joint Sealants: Sealants for other than glazing purposes.
   B. Section 081113 - Hollow Metal Doors and Frames: Glazed lites in doors.
   C. Section 081416 - Flush Wood Doors: Glazed lites in doors.
   D. Section 084313 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.
   E. Section 088300 - Mirrors.
   F. Section 102800 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.03  REFERENCE STANDARDS

1.04  ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05  SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
   C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
   D. Samples: Submit two samples 8 by 8 inch (203.2 by 203.2 mm) in size of glass units.
   E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06  WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:
   1. GGI - General Glass International: www.generalglass.com/#sle.

B. Float Glass Manufacturers:
   5. Vitro Architectural Glass (formerly PPG Glass); _____: www.vitroglazings.com/#sle.

C. Laminated Glass Manufacturers:

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.

2.03 INSULATING GLASS UNITS

A. Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
   4. Edge Seal:
      a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
      5. Color: Black.
      6. Purge interpane space with dry air, hermetically sealed.

2.04 GLAZING UNITS

A. Type G-14 - Direct to Glass Ceramic Printing: Ceramic frit is fused into glass creating permanent designs.
   1. Applications: Locations as indicated on drawings.
   2. Glass Type: Fully tempered; monolithic glass system.

2.05 GLAZING COMPOUNDS

2.06 ACCESSORIES

END OF SECTION 088000
SECTION 088300 - MIRRORS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Glass mirrors.
   1. Tempered safety glass.

1.02  REFERENCE STANDARDS

C. GANA (TIPS) - Mirrors: Handle with Extreme Care (Tips for the Professional on the Care and Handling of Mirrors); 2011.

PART 2  PRODUCTS

2.01  MATERIALS

A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

B. Mirror Glass; Type M1: ASTM C1036, Type 1 - Transparent Flat, Class 1 - Clear, Quality - Q1 (high-quality mirrors); silvering, protective coating, and quality requirements in compliance with ASTM C1503.
   1. Thickness: 1/4 inch (6 mm).
   2. Size: As noted on drawings.

2.02  ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness.
B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness.
C. Channel Frame: One piece, channel frame, stainless steel, Type 430, satin finish, 1/2 inch by 1/2 inch by 3/8 inch deep (12.7 mm by 12.7 mm by 9.5 mm deep) with 90 degree mitered corners.

PART 3  EXECUTION

3.01  INSTALLATION

A. Install mirrors in accordance with GANA (TIPS) and manufacturers recommendations.
B. Set mirrors plumb and level, and free of optical distortion.
C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

3.02  CLEANING

A. Remove labels after work is complete.
B. Clean mirrors and adjacent surfaces.

END OF SECTION 088300
SECTION 092116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Performance criteria for gypsum board assemblies.
   B. Metal stud wall framing.
   C. Metal channel ceiling framing.
   D. Acoustic insulation.
   E. Gypsum sheathing.
   F. Cementitious backing board.
   G. Gypsum wallboard.
   H. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS
   A. Section 054000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
   B. Section 061000 - Rough Carpentry: Building framing and sheathing.
   C. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.
   D. Section 072100 - Thermal Insulation: Acoustic insulation.
   E. Section 072500 - Weather Barriers: Water-resistive barrier over sheathing.

1.03 REFERENCE STANDARDS
   A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
   J. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
U. ASTM E413 - Classification for Rating Sound Insulation; 2016.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
B. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
   1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
   2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
C. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.

2.02 METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
   1. Studs: “C” shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C-shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
B. Loadbearing Studs for Application of Gypsum Board: As specified in Section 054000.
C. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
D. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.

4. Deflection and Firestop Track:
   a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
   b. Products:
      1) FireTrak Corporation; Posi Klip.
      2) Metal-Lite, Inc; The System.

2.03 BOARD MATERIALS

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Glass mat faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
   3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Thickness:
      a. Vertical Surfaces: 5/8 inch (16 mm).
      b. Ceilings: 5/8 inch (16 mm).
      c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   5. Paper-Faced Products:
      b. American Gypsum Company; FireBloc Type X Gypsum Wallboard.
      c. American Gypsum Company; FireBloc Type C Gypsum Wallboard.
      d. Continental Building Products; Firecheck Type C.
      e. Continental Building Products; Firecheck Type X.
      f. Continental Building Products; LiftLite.
      g. Continental Building Products; LiftLite Firecheck 30.
      h. Continental Building Products; Regular Drywall.
      i. Georgia-Pacific Gypsum; ToughRock.
      j. Georgia-Pacific Gypsum; ToughRock Fireguard X.
      k. Georgia-Pacific Gypsum; ToughRock Fireguard C.
      l. National Gypsum Company; Gold Bond BRAND Fire-Shield Gypsum Board.
      m. National Gypsum Company; Gold Bond 3/4" Ultra-Shield FS Gypsum Board.
      n. Substitutions: See Section 016000 - Product Requirements.
   6. Mold Resistant Paper Faced Products:
      a. American Gypsum Company; M-Bloc.
      b. American Gypsum Company; M-Bloc Type X.
      c. American Gypsum Company; M-Bloc Type C.
      d. Continental Building Products; Mold Defense.
      e. Continental Building Products; Mold Defense Type X.
      f. Georgia-Pacific Gypsum; ToughRock Mold-Guard.
      g. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard.
      h. National Gypsum Company; Gold Bond XP Gypsum Board.
      i. National Gypsum Company; Gold Bond 3/4" Ultra-Shield FS XP Gypsum Board.
   7. Glass Mat Faced Products:
      b. Continental Building Products; Weather Defense Platinum Interior Type X.
      c. Georgia-Pacific Gypsum; DensArmor Plus.
      d. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C.
      e. National Gypsum Company; Gold Bond eXP Interior Extreme Gypsum Panel.
f. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel.
g. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.

B. Backing Board For Wet Areas: One of the following products:
   1. Application: Surfaces behind tile in wet areas including.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
      a. Thickness: 5/8 inch (15.88 mm).
   4. ASTM Cement-Based Board: Non-gypsum-based, cementitious board complying with ASTM C1288.
   5. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
      a. Standard Type: Thickness 5/8 inch (15.88 mm).

C. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Application: Exterior sheathing, unless otherwise indicated.
   2. Edges: Square.

2.04 ACCESSORIES
   A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: _____ inch (_____ mm).
   B. Water-Resistive Barrier: As specified in Section 072500.
   C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
      1. Types: As detailed or required for finished appearance.
      2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
   D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   E. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
   F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
   G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION
   A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
      1. Install studs at spacing required to meet performance requirements.
   B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

3.03 FRAMING INSTALLATION
   A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
   B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   C. Studs: Space studs as indicated.
1. Extend partition framing to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Blocking: Install wood blocking for support of:
   1. Wall mounted cabinets.
   2. Plumbing fixtures.
   3. Toilet partitions.
   4. Toilet accessories.
   5. Wall mounted door hardware.

3.04 ACOUSTIC ACCESSORIES INSTALLATION
A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

3.05 BOARD INSTALLATION
A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
   1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.

E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

3.06 INSTALLATION OF TRIM AND ACCESSORIES
A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
   1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.07 JOINT TREATMENT
A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 3: Walls to receive textured wall finish.
   4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   5. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.08 TOLERANCES
   A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION 092116
SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Metal partition, ceiling, and soffit framing.
B. Framing accessories.

1.02 RELATED REQUIREMENTS
A. Section 054000 - Cold-Formed Metal Framing: Structural load bearing metal stud framing and Exterior wall stud framing.
B. Section 061000 - Rough Carpentry: Wood blocking within stud framing.
C. Section 072100 - Thermal Insulation: Insulation.
D. Section 092116 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.

1.03 REFERENCE STANDARDS

1.04 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

PART 2 PRODUCTS

2.01 FRAMING MATERIALS
A. Fire Rated Assemblies: Comply with applicable code and as indicated on drawings.
B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 7.5 psf (L/240 at 360 Pa).
   1. Studs: C shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.
   3. Ceiling Channels: C shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
C. Loadbearing Studs: As specified in Section 054000.
D. Acoustic Insulation: As specified in Section 072100.

PART 3 EXECUTION

3.01 INSTALLATION OF STUD FRAMING
A. Comply with requirements of ASTM C754.
B. Extend partition framing to structure where indicated and to ceiling in other locations.
C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
D. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
E. Align and secure top and bottom runners at 24 inches (600 mm) on center.
F. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
G. Align stud web openings horizontally.
H. Secure studs to tracks using fastener method. Do not weld.
I. Fabricate corners using a minimum of three studs.
J. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
K. Brace stud framing system rigid.
L. Coordinate erection of studs with requirements of door frames; install supports and attachments.
M. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
N. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.
O. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches (150 mm).

3.02 CEILING AND SOFFIT FRAMING
A. Comply with requirements of ASTM C754.
B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
C. Install furring independent of walls, columns, and above-ceiling work.
D. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated.
E. Space main carrying channels at maximum 72 inch (1 800 mm) on center, and not more than 6 inches (150 mm) from wall surfaces. Lap splice securely.
F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
G. Place furring channels perpendicular to carrying channels, not more than 2 inches (50 mm) from perimeter walls, and rigidly secure. Lap splices securely.

END OF SECTION 092216
SECTION 095100 - ACOUSTICAL CEILINGS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Suspended metal grid ceiling system.
B. Acoustical units.

1.02  REFERENCE STANDARDS
D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.03  ADMINISTRATIVE REQUIREMENTS
A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
B. Do not install acoustical units until after interior wet work is dry.

1.04  SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on suspension system components and acoustical units.
C. Samples: Submit two samples 6 by 6 inch (152.4 by 152.4 mm) in size illustrating material and finish of acoustical units.
D. Samples: Submit two samples each, 12 inches (304.8 mm) long, of suspension system main runner.
E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

PART 2  PRODUCTS

2.01  MANUFACTURERS
A. Acoustic Tiles/Panels:
B. Suspension Systems:
   1. Same as for acoustical units.

2.02  ACOUSTICAL UNITS
A. Acoustical Panels: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
   1. Size: 12 by 24 inches (300 by 600 mm).
   2. Thickness: 3/4 inches (19 mm).
   5. Suspension System: Exposed grid.
2.03 SUSPENSION SYSTEM(S)
   A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and
      interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down
      clips as required.
   B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled;
      intermediate-duty.
      1. Profile: Tee; 15/16 inch (24 mm) wide face.
      2. Construction: Double web.

2.04 ACCESSORIES
   A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic
      requirements, and ceiling system flatness requirement specified.
   B. Perimeter Moldings: Same material and finish as grid.
      1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of
         grid.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM
   A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and
      manufacturer's instructions and as supplemented in this section.
   B. Rigidly secure system, including integral mechanical and electrical components, for maximum
      deflection of 1:360.
   C. Install after major above-ceiling work is complete. Coordinate the location of hangers with
      other work.
   D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where
      carrying members are spliced, avoid visible displacement of face plane of adjacent members.
   E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest
      affected hangers and related carrying channels to span the extra distance.
   F. Do not support components on main runners or cross runners if weight causes total dead load
      to exceed deflection capability.
   G. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each
      corner, or support components independently.
   H. Do not eccentrically load system or induce rotation of runners.
   I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with
      other interruptions.
      1. Use longest practical lengths.
      2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS
   A. Install acoustical units in accordance with manufacturer's instructions.
   B. Fit acoustical units in place, free from damaged edges or other defects detrimental to
      appearance and function.
   C. Fit border trim neatly against abutting surfaces.
   D. Install units after above-ceiling work is complete.
   E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
F. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

**END OF SECTION 095100**
SECTION 099113 - EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints, stains, and varnishes.
C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other types of tiles.
   9. Glass.
   10. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 055000 - Metal Fabrications: Shop-primed items.
C. Section 099123 - Interior Painting.

1.03 REFERENCE STANDARDS

C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
F. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
2. Allow 30 days for approval process, after receipt of complete samples by Architect.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
   B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
   C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
      1. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
      2. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.
   B. Paints:
   C. Transparent Finishes:
   D. Stains:
   E. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL
   A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
      1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

3. Supply each paint material in quantity required to complete entire project's work from a single production run.

4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.

2.03 PAINT SYSTEMS - EXTERIOR

   1. One top coat and one coat primer.
   2. Top Coat(s): Exterior Latex; MPI #10, 11, 15, 119, or 214.
   3. Top Coat Sheen:
      a. Velvet: MPI gloss level 2; use this sheen at all locations.
   4. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint E-Pav - Pavement Marking Paint:
   1. Yellow: One coat, with reflective particles; ________.
   2. White: One coat, with reflective particles; ________.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
   2. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
   3. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete:
   1. Clean surfaces with pressurized water. Allow to dry.
2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

G. Masonry:
1. Prepare surface as recommended by top coat manufacturer.
2. Clean surfaces with pressurized water. Allow to dry.

H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

J. Galvanized Surfaces:
1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
2. Prepare surface according to SSPC-SP 2.

K. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

L. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

M. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION
A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

F. Sand wood and metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL
A. See Section 014000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING
A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION
A. Touch-up damaged finishes after Substantial Completion.
3.07 COLOR SCHEDULE

END OF SECTION 099113
SECTION 099123 - INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints, stains, and varnishes.
C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other tiles.
   9. Glass.
   10. Acoustical materials, unless specifically indicated.
   11. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 055000 - Metal Fabrications: Shop-primed items.
C. Section 099113 - Exterior Painting.

1.03 REFERENCE STANDARDS

C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
E. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
F. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, submit samples in only that sheen.
2. Allow 30 days for approval process, after receipt of complete samples by Architect.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for submittals.
2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.

B. Paints:

C. Transparent Finishes:
2. PPG Paints Deft Interior Clears/Polyurethanes: www.ppgpaints.com/sle.

D. Stains:
E. Primer Sealers: Same manufacturer as top coats.
F. Substitutions: See Section 016000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL
A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.

2.03 PAINT SYSTEMS - INTERIOR
A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, wood, uncoated steel, shop primed steel, galvanized steel, and aluminum.
   1. Two top coats and one coat primer.
   2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
   3. Top Coat Sheen:
      a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
      b. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
   4. Primer: As recommended by top coat manufacturer for specific substrate.
B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
   1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
   2. Two top coats and one coat primer.
   3. Top Coat(s): High Performance Architectural Interior Latex; MPI #139, 140, or 141.
   4. Top Coat Sheen:
      a. Satin: MPI gloss level 4; use this sheen at all locations.
   5. Primer: As recommended by top coat manufacturer for specific substrate.
C. Paint I-OP-FL - Concrete Floors to be Painted.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Alkyd Floor Enamel, Gloss; MPI #27.
   3. Top Coat Sheen:
      a. Gloss: MPI gloss level 6; use this sheen at all locations.
   4. Primer: As recommended by top coat manufacturer for specific substrate.
D. Paint I-TR -W - Transparent Finish on Wood.
   1. 1 top coat over sanding sealer over stain.
   2. Top Coat(s): Polyurethane Varnish, Oil Modified; MPI #56 or 57.
   3. Top Coat Sheen:
      a. Gloss: MPI gloss level 6; use this sheen at all locations.

2.04 ACCESSORY MATERIALS
A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
C. Test shop-applied primer for compatibility with subsequent cover materials.
D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Masonry Units : 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   4. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Remove or repair existing paints or finishes that exhibit surface defects.
D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
E. Seal surfaces that might cause bleed through or staining of topcoat.
F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
G. Concrete:
   1. Clean surfaces with pressurized water. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
H. Masonry:
   1. Prepare surface as recommended by top coat manufacturer.
   2. Clean surfaces with pressurized water. Allow to dry.
I. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
J. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
K. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
L. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.
M. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
N. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

O. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

P. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with tinted primer.

Q. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

F. Sand wood and metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 099123
SECTION 101400 - SIGNAGE

PART 1  GENERAL
1.01  SECTION INCLUDES
   A. Room and door signs.

1.02  REFERENCE STANDARDS

1.03  SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
   C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
      1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
      2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
      3. Submit for approval by Owner through Architect prior to fabrication.
   D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
   E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
   F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

1.04  FIELD CONDITIONS
   A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
   B. Maintain this minimum temperature during and after installation of signs.

PART 2  PRODUCTS
2.01  MANUFACTURERS
   A. Flat Signs:

2.02  SIGNAGE APPLICATIONS
   A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 local codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
   B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
      1. Sign Type: Flat signs with engraved panel media as specified.
      2. Provide “tactile” signage, with letters raised minimum 1/32 inch (0.8 mm) and Grade II braille.
      3. Character Height: 1 inch (25 mm).
      4. Sign Height: 2 inches (50 mm), unless otherwise indicated.
5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings.
6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
7. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
8. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.

2.03 SIGN TYPES
A. Flat Signs: Signage media without frame.
   1. Edges: Square.
   2. Corners: Radiused.
   4. Wall and Ceiling Mounting of Two-Sided Signs: Aluminum wall bracket, powder coated, color selected from manufacturer's standard colors, attached with screws in predrilled mounting holes, set in clear silicone sealant.
   5. Suspended Mounting: Stainless steel suspension cables, cable clamps, and ceiling fastener suitable for attachment to ceiling construction indicated.
B. Color and Font: Unless otherwise indicated:
   1. Character Font: Helvetica, Arial, or other sans serif font.
   2. Character Case: Upper case only.

2.04 TACTILE SIGNAGE MEDIA
A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
   1. Total Thickness: 1/16 inch (1.6 mm).

2.05 ACCESSORIES
A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Install neatly, with horizontal edges level.
C. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION 101400
SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Corner guards.

1.02 RELATED REQUIREMENTS
   A. Section 055000 - Metal Fabrications: Corner guards fabricated from rolled metal sections or bent plate.

PART 2 PRODUCTS

2.01 PRODUCT TYPES
   A. Corner Guards - Surface Mounted:
      1. Corner guards fabricated from rolled section or bent plate are specified in Section 055000.
      3. Material: Type 304 stainless steel, No. 4 finish, 16 gage, 0.0625 inch (1.59 mm) thick.
      4. Width of Wings: 2 inches (51 mm).
      5. Corner: Square.
      6. Color: As selected from manufacturer's standard colors.
      7. Length: One piece.

2.02 FABRICATION
   A. Fabricate components with tight joints, corners and seams.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Position corner guard 4 inches (102 mm) above finished floor to 36 inches high (914.4 mm high).

END OF SECTION 102600
SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Commercial toilet accessories.
B. Under-lavatory pipe supply covers.

1.02 RELATED REQUIREMENTS
A. Section 088300 - Mirrors: Other mirrors.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

1.05 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Commercial Toilet, Shower, and Bath Accessories:

2.02 FINISHES
A. Stainless Steel: Satin finish, unless otherwise noted.

2.03 COMMERCIAL TOILET ACCESSORIES
   1. Products:

B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator.
   1. Capacity: 300 C-fold minimum.
   2. Products:

C. Waste Receptacle: Recessed, stainless steel.
   1. Products:

D. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator, tumbler lock.
   1. Products:

E. Air Freshener Dispenser: Wall-mounted, battery operated.
   1. Products:

F. Seat Cover Dispenser: Stainless steel, surface-mounted, reloading by concealed opening at base.
   2. Products:

G. Grab Bars: Stainless steel, smooth surface.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
      b. Dimensions: 1-1/2 inch (38 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, concealed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
      c. Finish: Satin.
      d. Length and Configuration: As indicated on drawings.
      e. Products:
         1) Bradley Corporation: Model 812 Series Grab Bars 1 1/2" with Concealed Mounting.
         2) American Specialties, Inc.: Model 3800 Series 1-1/2" Dia. – Snap Flange Grab Bars.

H. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
   1. Products:

2.04 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers:
   1. Insulate exposed drainage piping including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
   2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
   3. Construction: 1/8 inch (3.2 mm) flexible PVC.
      a. Comply with ASTM C1822, type indicated.
   5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.
   6. Products:
a. Plumberex Specialty Products, Inc; Plumberex Handy-Shield Maxx: www.plumberex.com/#sle.
b. Plumberex Specialty Products, Inc; Plumberex Trap Gear: www.plumberex.com/#sle.

PART 3 EXECUTION

3.01 PREPARATION
A. Deliver inserts and rough-in frames to site for timely installation.
B. Provide templates and rough-in measurements as required.

3.02 INSTALLATION
A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
B. Install plumb and level, securely and rigidly anchored to substrate.
C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Grab Bars: As indicated on drawings.
   2. Other Accessories: As indicated on drawings.

END OF SECTION 102800
SECTION 220513 - COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. General construction and requirements.
   B. Applications.
   C. Single phase electric motors.
   D. Three phase electric motors.

1.02 RELATED REQUIREMENTS
   A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
   A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.
   C. NEMA MG 1 - Motors and Generators; 2017.
   D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 QUALITY ASSURANCE
   A. Conform to NFPA 70.

PART 2 PRODUCTS

2.01 GENERAL CONSTRUCTION AND REQUIREMENTS
   A. Construction:
      1. Open drip-proof type except where specifically noted otherwise.
      2. Design for continuous operation in 104 degrees F (40 degrees C) environment.
      3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
   B. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
   C. Wiring Terminations:
      1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
      2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.02 APPLICATIONS

2.03 SINGLE PHASE POWER - CAPACITOR START MOTORS
   A. Starting Torque: Three times full load torque.
   B. Starting Current: Less than five times full load current.
   C. Pull-up Torque: Up to 350 percent of full load torque.
   D. Breakdown Torque: Approximately 250 percent of full load torque.
   E. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with two capacitors in parallel with run capacitor remaining in circuit at operating speeds.
   F. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.
2.04 THREE PHASE POWER - SQUIRREL CAGE MOTORS

A. Starting Torque: Between 1 and 1-1/2 times full load torque.
B. Starting Current: Six times full load current.
C. Power Output, Locked Rotor Torque, Breakdown or Pull Out Torque: NEMA Design B characteristics.
E. Insulation System: NEMA Class B or better.
F. Testing Procedure: In accordance with IEEE 112. Load test motors to determine free from electrical or mechanical defects in compliance with performance data.
G. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
H. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA STD 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.
I. Nominal Efficiency: As indicated at full load and rated voltage when tested in accordance with IEEE 112.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION 220513
SECTION 220516 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Flexible pipe connectors.
   B. Pipe loops, offsets, and swing joints.

1.02 RELATED REQUIREMENTS
   A. Section 221005 - Plumbing Piping.

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data:
      1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot (meter) and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
      2. Manufacturer's Instructions: Indicate manufacturer's installation instructions, special procedures, and external controls.

PART 2 PRODUCTS

2.01 FLEXIBLE PIPE CONNECTORS - STEEL PIPING
   A. Manufacturers:
   B. Inner Hose: Carbon steel.
   D. Pressure Rating: 200 psi and 250 degrees F (1380 kPa and 121 degrees C).
   E. Joint: Threaded with union.
   F. Maximum offset: 3/4 inch (20 mm) on each side of installed center line.

2.02 EXPANSION LOOPS - HOSE AND BRAID
   A. Manufacturers:
      2. Substitutions: See Section 016000 - Product Requirements.
   B. Provide flexible loops with two flexible sections of hose and braid, two 90 degree elbows, and 180 degree return with support bracket and air release or drain plug.
   C. Provide flexible loops capable of movement in the x, y, and z planes. Flexible loops to impart no thrust loads to the building structure.
   D. Flexible Connectors: Flanged, braided type with wetted components of stainless steel, sized to match piping.
      1. Maximum Allowable Working Pressure: 150 psig (1030 kPa) at 120 degrees F (49 degrees C).
      2. Accommodate the Following:
         a. Axial Deflection in Compression and Expansion: _____ inch (_____ mm).
         b. Lateral Movement: _____ inch (_____ mm).
         c. Angular Rotation: 15 degrees.
         d. Force developed by 1.5 times specified maximum allowable operating pressure.
      3. End Connections: Same as specified for pipe jointing.
      4. Provide necessary accessories including, but not limited to, swivel joints.
2.03 ACCESSORIES

A. Pipe Alignment Guides:
   1. Manufacturers:
      2. Two piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame
         with four mounting holes, clearance for minimum 1 inch (25 mm) thick insulation,
         minimum 3 inches (75 mm) travel.

B. Swivel Joints:
   1. Fabricated steel body, double ball bearing race, field lubricated, with rubber (Buna-N)
      o-ring seals.

END OF SECTION 220516
SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Manufactured sleeve-seal systems.

1.02 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.03 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
   B. Installer Qualifications: Company specializing in performing work of the type specified this section.

1.04 DELIVERY, STORAGE, AND HANDLING
   A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.
   B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

PART 2 PRODUCTS

2.01 MANUFACTURED SLEEVE-SEAL SYSTEMS
   A. Manufacturers:
      1. Flexicraft Industries; PipeSeal: www.flexicraft.com/#sle.
      2. Substitutions: See Section 016000 - Product Requirements.
   B. Modular/Mechanical Seal:
      1. Synthetic rubber interlocking links continuously fill annular space between pipe and wall/casing opening.
      2. Provide watertight seal between pipe and wall/casing opening.
      3. Elastomer element size and material in accordance with manufacturer's recommendations.
      4. Glass reinforced plastic pressure end plates.

END OF SECTION 220517
SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Pressure gages and pressure gage taps.
B. Thermometers and thermometer wells.

1.02  REFERENCE STANDARDS
A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.
D. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.

1.03  SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

1.04  FIELD CONDITIONS
A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2  PRODUCTS

2.01  PRESSURE GAGES
A. Manufacturers:

B. Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
   1. Case: Steel with brass bourdon tube.
   2. Size: 4-1/2 inch (115 mm) diameter.
   3. Mid-Scale Accuracy: One percent.

2.02  PRESSURE GAGE TAPPINGS
A. Gage Cock: Tee or lever handle, brass for maximum 150 psi (1034 kPa).

2.03  STEM TYPE THERMOMETERS
A. Manufacturers:

B. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
   1. Size: 9 inch (225 mm) scale.
2. Window: Clear Lexan.
3. Accuracy: 2 percent, per ASTM E77.
4. Calibration: Degrees F.

2.04 DIAL THERMOMETERS

A. Manufacturers:

B. Thermometers - Adjustable Angle: Dial type bimetallic actuated; ASTM E1; stainless steel case, adjustable angle with front recalibration, silicone fluid damping, white with black markings and black pointer, hermetically sealed lens, stainless steel stem.
   1. Size: 5 inch (125 mm) diameter dial.
   2. Accuracy: 1 percent.
   3. Calibration: Degrees F.

2.05 TEST PLUGS

A. Test Plug: 1/4 inch (6 mm) or 1/2 inch (13 mm) brass fitting and cap for receiving 1/8 inch (3 mm) outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F (93 degrees C).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch (60 mm) for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

C. Locate test plugs adjacent thermometers and thermometer sockets.

   END OF SECTION 220519
SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Applications.
B. General requirements.
C. Ball valves.
D. Butterfly valves.
E. Check valves.
F. Plug valves.

1.02 ABBREVIATIONS AND ACRONYMS
A. CWP: Cold working pressure.
B. EPDM: Ethylene propylene copolymer rubber.
C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
D. NRS: Non-rising stem.
E. PTFE: Polytetrafluoroethylene.
F. RS: Rising stem.
G. SWP: Steam working pressure.
H. TFE: Tetrafluoroethylene.

1.03 REFERENCE STANDARDS
A. ASME B1.20.1 - Pipe Threads, General Purpose (Inch); 2013.
B. ASME B31.9 - Building Services Piping; 2014.
F. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service; 2010a.
G. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; 2011.
H. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.
I. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

1.05 QUALITY ASSURANCE
A. Manufacturer:
   1. Obtain valves for each valve type from single manufacturer.
   2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.
1.06 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
   1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
   2. Protect valve parts exposed to piped medium against rust and corrosion.
   3. Secure check valves in either the closed position or open position.
   4. Adjust butterfly valves to closed or partially closed position.

B. Use the following precautions during storage:
   1. Maintain valve end protection and protect flanges and specialties from dirt.
      a. Provide temporary inlet and outlet caps.
      b. Maintain caps in place until installation.
   2. Store valves in shipping containers and maintain in place until installation.
      a. Store valves indoors in dry environment.
      b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

1.07 EXERCISE THE FOLLOWING PRECAUTIONS FOR HANDLING:

A. Handle large valves with sling, modified to avoid damage to exposed parts.

B. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Provide the following valves for the applications if not indicated on Drawings:
   1. Shutoff: Ball, butterfly, plug.
   2. Throttling: Provide ball.
   3. Swing Check (Pump Outlet):
      a. 2 NPS (50 DN) and Smaller: Bronze swing check valves with bronze disc.

B. Substitutions of valves with higher CWP classes or SWP ratings for same valve types are permitted when specified CWP ratings or SWP classes are not available.

C. Required Valve End Connections for Non-Wafer Types:
   1. Steel Pipe:
      a. 2 NPS (50 DN) and Smaller: Threaded ends.
   2. Copper Tube:
      a. 2 NPS (50 DN) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

D. Low Pressure, Compressed Air Valves 150 psig (1035 kPa) or Less:
   1. 2 NPS (50 DN) and Smaller:
      a. Bronze: Provide with threaded ends.
      b. Ball: Two piece, full port, bronze with stainless-steel trim.
      c. Bronze Swing Check: Class 150, bronze disc.

E. High Pressure, Compressed Air Valves 150 psig (1035 kPa) to 200 psig (1380 kPa):
   1. 2 NPS (50 DN) and Smaller:
      a. Bronze: Provide with threaded ends.
      b. Ball: Two piece, full port, bronze with stainless-steel trim.
      c. Bronze Swing Check: Class 150, bronze disc.

F. Domestic, Hot and Cold Water Valves:
   1. 2 NPS (50 DN) and Smaller:
      a. Bronze: Provide with solder-joint or threaded ends.
      b. Ball: Two piece, full port, bronze with stainless-steel trim.
      c. Bronze Swing Check: Class 125, bronze disc.
2.02 GENERAL REQUIREMENTS
A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
B. Valve Sizes: Match upstream piping unless otherwise indicated.
C. Valve Actuator Types:
D. Valve-End Connections:
E. General ASME Compliance:

2.03 BRONZE BALL VALVES
A. Two Piece, Full Port with Stainless Steel Trim:
   1. Comply with MSS SP-110.
   2. SWP Rating: 150 psig (1035 kPa).
   3. CWP Rating: 600 psig (4140 kPa).
   5. Ends: Threaded.
   6. Seats: PTFE.

2.04 BRONZE SWING CHECK VALVES
A. Class 125: CWP Rating: 200 psig (1380 kPa).
   1. Comply with MSS SP-80, Type 3.
   2. Design: Horizontal flow.
   4. Ends: Threaded as indicated.
   5. Disc: Bronze.

2.05 LUBRICATED PLUG VALVES
A. Regular Gland with Threaded Ends:
   1. Comply with MSS SP-78, Type II.
   3. Body: ASTM A48/A48M or ASTM A126, cast iron with lubrication sealing system.
   4. Pattern: Regular or short.
   5. Plug: Cast iron or bronze with sealant groove.

PART 3 EXECUTION
3.01 EXAMINATION
A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.
B. Verify valve parts to be fully operational in all positions from closed to fully open.
C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
D. Should valve is determined to be defective, replace with new valve.

3.02 INSTALLATION
A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.

END OF SECTION 220523
SECTION 220548 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 2 PRODUCTS

1.01 PERFORMANCE REQUIREMENTS

A. General:
   1. All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.

1.02 EQUIPMENT SUPPORT BASES

1.03 VIBRATION ISOLATORS

END OF SECTION 220548
VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Tags.
   B. Pipe markers.
   C. Ceiling tacks.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
   C. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS
   A. Piping: Pipe markers.
   B. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 TAGS
   A. Manufacturers:
      2. Substitutions: See Section 016000 - Product Requirements.
   B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.

2.03 PIPE MARKERS
   A. Manufacturers:
      2. Substitutions: See Section 016000 - Product Requirements.
   B. Comply with ASME A13.1.
   C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
   D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
   E. Color code as follows:
      1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.
      2. Flammable Fluids: Yellow with black letters.
      4. Compressed Air: Blue with white letters.

2.04 CEILING TACKS
   A. Description: Steel with 3/4 inch (20 mm) diameter color coded head.
   B. Color code as follows:
      1. Plumbing Valves: Green.

PART 3 EXECUTION

3.01 PREPARATION
   A. Degrease and clean surfaces to receive adhesive for identification materials.
3.02 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

END OF SECTION 220553
SECTION 220719 - PLUMBING PIPING INSULATION

PART 2 PRODUCTS

1.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

END OF SECTION 220719
SECTION 221005 - PLUMBING PIPING

PART 2 PRODUCTS

1.01 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

END OF SECTION 221005
SECTION 221006 - PLUMBING PIPING SPECIALTIES

PART 2 PRODUCTS

1.01 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

END OF SECTION 221006
SECTION 221500 - GENERAL-SERVICE COMPRESSED-AIR SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Pipe and pipe fittings.
B. Air compressor.
C. Air receiver and accessories.
D. Refrigerated air dryer.

1.02 RELATED REQUIREMENTS
A. Section 033000 - Cast-in-Place Concrete.
B. Section 220513 - Common Motor Requirements for Plumbing Equipment.
C. Section 220523 - General-Duty Valves for Plumbing Piping.
D. Section 220553 - Identification for Plumbing Piping and Equipment: Identification of piping system.
E. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.
F. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
G. NEMA ICS 4 - Application Guideline for Terminal Blocks; 2015.
H. NEMA MG 1 - Motors and Generators; 2017.
I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.
C. Shop Drawings: Indicate piping system schematic with electrical characteristics and connection requirements.
D. Certificates: Provide certificate of compliance from Authority Having Jurisdiction indicating approval of air receiver.
E. Manufacturer's Instructions: Indicate manufacturer's installation instructions, hoisting and setting requirements, starting procedures.
F. Operation Data: Submit for air compressor, air receiver and accessories, after cooler, refrigerated air dryer, and pressure reducing station.
G. Maintenance Data: Submit for air compressor, air receiver and accessories, after cooler, refrigerated air dryer, and pressure reducing station.
H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
   B. Pressure Vessels: Conform to applicable code for installation of pressure vessels.
   C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept air compressors, refrigerated air dryer on site in factory fabricated containers with shipping skids and plastic pipe end protectors in place. Inspect for damage.
   B. Protect piping and equipment from weather and construction traffic.

1.07 WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Provide five year manufacturer warranty for reciprocating air compressors.

PART 2 PRODUCTS
2.01 PIPE AND PIPE FITTINGS
   A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
      2. Joints: Threaded or welded to ASME B31.1.

2.02 AIR OUTLETS
   A. Quick Connector: 3/8 inch (10 mm) brass, snap on connector with self closing valve, Style A.

2.03 UNIONS AND COUPLINGS
   A. Unions:
      1. Ferrous Pipe: 150 psi (1034 kPa) malleable iron threaded unions.

2.04 COMPRESSOR
   A. Manufacturers:
   B. Type: Duplex compressor unit consisting of air cooled compressor, air receiver, after cooler, refrigerated air dryer.
   C. Screw Compressors:
      1. Unit: Direct drive, open drive, 3600 RPM, fixed compression, rotary screw compressor with control panel.
      2. Features: Differential pressure oil pump, oil separator and filter, oil charging valve, compressor bearings with ABMA STD 9, L10 life expectancy at 100,000 hours.
      3. Motor: Open drip proof flange squirrel cage induction, close coupled to compressor.
      4. Control panel: Factory mounted NEMA ICS 4 panel with starter and refrigeration controls including:
         a. Non-fused molded case disconnect switch.
         b. Single point power connection and grounding lug.
         c. Solid state overload relay for each compressor.
         d. Phase loss/reversal monitor.
         e. Cycle counter and hour meter per compressor.
         f. Automatic shutdown on compressor overload.
   D. Motor: Refer to Section 220513.
E. Controls:
1. Compressor Regulation: Lead-lag switch with time delay relay.
2. Electrical Alternation: Operate each compressor for 12 hours. If one compressor fails, second shall automatically maintain air pressure.

F. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

G. Disconnect Switch: Factory mount disconnect switch in control panel.

H. Cord and Plug: Provide unit with 6 foot (2 m) cord and plug for connection to electric wiring system including grounding connector.

2.05 AIR DRYER

A. Manufacturers:

B. Type: Self contained mechanical refrigeration type complete with heat exchanger, refrigeration compressor, automatic controls, moisture removal trap, internal wiring and piping, and full refrigerant charge.

C. Air Connections: Inlet and outlet connections at same level, factory insulated.

D. Heat Exchangers: Air to air and refrigerant to air coils. Provide heat exchangers with automatic control system to bypass refrigeration system on low or no load condition.

E. Moisture Separator: Centrifugal type located at discharge of heat exchanger.

F. Refrigeration Unit: Hermetically sealed type to operate continuously to maintain specified 21 degrees F (-6 degrees C) dew point. House unit in steel cabinet provided with access door and panel for maintenance and inspection.

G. Accessories: Air inlet temperature gage, air inlet pressure gage, on/off switch, high temperature light, power on light, refrigerant gage, air outlet temperature gage, air outlet pressure gage.

H. Motor: Refer to Section 220513.

I. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

J. Disconnect Switch: Factory mount disconnect switch in control panel.

2.06 AIR RECEIVER

A. Manufacturers:

B. Receiver: Vertical, built to ASME regulations for working pressure of 200 psi (1380 kPa). Flange or screw inlet and outlet connections.

C. Fittings: Adjustable pressure regulator, safety valve, pressure gage, drain cock, and automatic float actuated condensate trap.

D. Tank Finish: Shop primed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.
B. Install compressor unit on concrete housekeeping pad. Refer to Section 033000.
C. Make air cock and drain connection on horizontal casing.
D. Install line size ball valve and check valve on compressor discharge. Refer to Section 220523.
E. Connect condensate drains to nearest floor drain.
F. Install valved bypass around air dryer. Factory insulate inlet and outlet connections. Refer to Section 220523.
G. Install valved drip connections at low points of piping system. Refer to Section 220523.
H. Install takeoffs to outlets from top of main, with shut off valve after take off. Slope take off piping to outlets.
I. Install compressed air couplings, female quick connectors, and pressure gages where outlets are indicated.
J. Install tees instead of elbows at changes in direction of piping. Fit open end of each tee with plug.
K. Identify piping system and components. Refer to Section 220553.

3.02 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.
B. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.1.
C. Repair or replace compressed air piping as required to eliminate leaks, and retest to demonstrate compliance.
D. Cap and seal ends of piping when not connected to mechanical equipment.

END OF SECTION 221500
SECTION 223000 - PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Water Heaters:
   1. Commercial electric.
B. Diaphragm-type compression tanks.
C. In-line circulator pumps.

1.02 RELATED REQUIREMENTS
A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittals procedures.
B. Product Data:
   1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
   2. Indicate pump type, capacity, power requirements.
   3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
   4. Provide electrical characteristics and connection requirements.
C. Shop Drawings:
   1. Indicate heat exchanger dimensions, size of tappings, and performance data.
   2. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.
D. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner’s name and registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Certifications:
   2. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.07 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Provide five year manufacturer warranty for domestic water heaters.

PART 2 PRODUCTS

2.01 WATER HEATERS

A. Manufacturers:

B. Commercial Electric:
   1. Type: Factory-assembled and wired, electric, vertical storage.
   2. Performance:
   3. Electrical Characteristics:
      a. 208 volts, three phase, 60 Hz.
   4. Tank: Glass lined welded steel; 4 inch (100 mm) diameter inspection port, thermally insulated with minimum 2 inches (50 mm) glass fiber encased in corrosion-resistant steel jacket; baked-on enamel finish.
   5. Controls: Automatic immersion water thermostat; externally adjustable temperature range from 60 to 180 degrees F (16 to 82 degrees C), flanged or screw-in nichrome elements, high temperature limit thermostat.
   6. Accessories:
      b. Dip Tube: Brass.
      c. Drain valve.
      d. Anode: Magnesium.
      e. Temperature and Pressure Relief Valve: ASME labeled.
   7. Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 75 W/sq in (11.6 W/sq m).

2.02 IN-LINE CIRCULATOR PUMPS

A. Manufacturers:
   2. Paco.

B. Casing: Bronze, rated for 125 psig (860 kPa) working pressure, with stainless steel rotor assembly.

C. Impeller: Bronze.

D. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.

E. Seal: Carbon rotating against a stationary ceramic seat.

F. Drive: Flexible coupling.

2.03 ELECTRICAL WORK

A. Provide electrical motor driven equipment specified complete with motors, motor starters, controls, and wiring.

B. Electrical characteristics to be as specified or indicated.

C. Furnish motor starters complete with thermal overload protection and other appurtenances necessary for the motor control specified.

D. Supply manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices not shown.
PART 3 EXECUTION

3.01 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.

C. Domestic Water Heat Exchangers:
   1. Install domestic water heat exchangers with clearance for tube bundle removal without disturbing other installed equipment or piping.
   2. Support unit on pipe stand.
   3. Pipe relief valves and drains to nearest floor drain.

D. Pumps:
   1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

END OF SECTION 223000
SECTION 224000 - PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Water closets.
B. Urinals.
C. Lavatories.
D. Service sinks.
E. Under-lavatory pipe supply covers.
F. Wash fountains.
G. Emergency showers.

1.02 RELATED REQUIREMENTS
A. Section 221005 - Plumbing Piping.
B. Section 221006 - Plumbing Piping Specialties.
C. Section 223000 - Plumbing Equipment.
D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011.
F. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
G. ASME A112.18.1 - Plumbing Supply Fittings; 2012.
I. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2013.

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
C. Manufacturer’s Instructions: Indicate installation methods and procedures.
D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner’s name and registered with manufacturer.
1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

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

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Accept fixtures on site in factory packaging. Inspect for damage.
   B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.08 WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.01 GENERAL
   A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 FLUSH VALVE WATER CLOSETS
      1. Flush Valve: Exposed (top spud).
      3. Handle Height: 44 inches (1117 mm) or less.
      5. Manufacturers:
         d. Substitutions: See Section 016000 - Product Requirements.
   B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
      1. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
      2. Manufacturers:
         b. Substitutions: See Section 016000 - Product Requirements.
   C. Seats:
      1. Manufacturers:
         d. Olsonite; ______: wwwolsonite.com.
         f. Substitutions: See Section 016000 - Product Requirements.
   D. Water Closet Carriers:
      1. Manufacturers:
         c. Substitutions: See Section 016000 - Product Requirements.
2. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.03 WALL HUNG URINALS

A. Wall Hung Urinal Manufacturers:

   1. Flush Volume: 1.0 gallons (3.7 liters), maximum.
   2. Flush Valve: Exposed (top spud).
   4. Trap: Integral.

C. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
   1. Sensor-Operated Type: Solenoid operator, low voltage hard-wired, infrared sensor and over-ride push button.
   2. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.
   3. Manufacturers:
      b. Substitutions: See Section 016000 - Product Requirements.

D. Carriers:
   1. Manufacturers:
      c. Substitutions: See Section 016000 - Product Requirements.

2.04 LAVATORIES

A. Lavatory Manufacturers:

B. Supply Faucet Manufacturers:

2.05 UNDER-LAVATORY PIPE SUPPLY COVERS


B. General:
   1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
   2. Construction: 1/8 inch (3.2 mm) PVC with antimicrobial, antifungal and UV resistant properties.
      a. Comply with ASTM C1822 Type III for covers on accessible lavatory piping.
      b. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
      c. Comply with ICC A117.1.
   3. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces. No cable ties allowed.
2.06 WASH FOUNTAINS

A. Freestanding Wash Fountains:
   1. Bowl: Circular, 36 inch (900 mm) diameter, precast stone.
   2. Accessories: Foot controlled self-closing valve, spray head, liquid soap dispenser, manual mixing valve, supporting tube, spud and strainer, operating mechanism, foot levers and rail, combination stop, strainer and check valves.
   3. Manufacturers:
      c. Willoughby.
      d. Substitutions: See Section 016000 - Product Requirements.

2.07 SERVICE SINKS

A. Service Sink Manufacturers:

B. Bowl: ASME A112.19.1; 24 by 24 by 12 inch (____ by ____ by ____ mm) deep, porcelain enamelled (inside only) cast iron roll-rim sink, with 12 inch (300 mm) high back, concealed hanger, chrome plated strainer, stainless steel rim guard, cast iron P-trap with adjustable floor flange.

C. Trim: ASME A112.18.1 exposed wall type supply with cross handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges.

D. Accessories:
   1. 5 feet (1.5 m) of 1/2 inch (13 mm) diameter plain end reinforced plastic hose.
   2. Hose clamp hanger.
   3. Mop hanger.

2.08 EMERGENCY SHOWERS

A. Emergency Shower: ANSI Z358.1; wall-mounted, self-cleaning, non-clogging 8 inch (200 mm) diameter stainless steel deluge shower head with elbow, one inch (25 mm) full flow valve with pull chain and 8 inch (200 mm) diameter ring, one inch (25 mm) interconnecting fittings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with quarter turn stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall carriers and bolts.

E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.
3.04 CLEANING
   A. Clean plumbing fixtures and equipment.

3.05 PROTECTION
   A. Protect installed products from damage due to subsequent construction operations.
   B. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 224000
PART 1  GENERAL

1.01  SECTION INCLUDES
   A. General construction and requirements.
   B. Applications.
   C. Single phase electric motors.
   D. Three phase electric motors.
   E. Electronically Commutated Motors (ECM).

1.02  REFERENCE STANDARDS
   A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.
   C. NEMA MG 1 - Motors and Generators; 2017.
   D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03  SUBMITTALS
   A. See Section 013000 - Administrative Requirements for submittal procedures.
   B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.
   C. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.

1.04  QUALITY ASSURANCE
   A. Conform to NFPA 70.
   B. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of high efficiency motors.
   C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

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

1.06  WARRANTY
   A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2  PRODUCTS

2.01  GENERAL CONSTRUCTION AND REQUIREMENTS
   A. Construction:
      1. Open drip-proof type except where specifically noted otherwise.
      2. Design for continuous operation in 104 degrees F (40 degrees C) environment.
      3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
   B. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
   C. Wiring Terminations:
1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.02 APPLICATIONS
A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not conform to these specifications.
B. Single phase motors for fans and blowers: Capacitor start, capacitor run type.

2.03 SINGLE PHASE POWER - CAPACITOR START MOTORS
A. Starting Torque: Three times full load torque.
B. Starting Current: Less than five times full load current.
C. Pull-up Torque: Up to 350 percent of full load torque.
D. Breakdown Torque: Approximately 250 percent of full load torque.
E. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with two capacitors in parallel with run capacitor remaining in circuit at operating speeds.
F. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.

2.04 THREE PHASE POWER - SQUIRREL CAGE MOTORS
A. Starting Torque: Between 1 and 1-1/2 times full load torque.
B. Starting Current: Six times full load current.
C. Power Output, Locked Rotor Torque, Breakdown or Pull Out Torque: NEMA Design B characteristics.
E. Insulation System: NEMA Class B or better.
F. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
G. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay for wiring into motor starter; refer to Section 262913.
H. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA STD 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.
I. Sound Power Levels: To NEMA MG 1.
J. Nominal Efficiency: As indicated at full load and rated voltage when tested in accordance with IEEE 112.
K. Nominal Power Factor: As indicated at full load and rated voltage when tested in accordance with IEEE 112.

2.05 ELECTRONICALLY COMMUTATED MOTORS (ECM)
A. Applications:
   1. Residential:
      a. Furnace:
         1) Operating Mode: Constant cfm.
         2) Input: Motor manufacturer to coordinate control requirements with the control board of the furnace.
3) RPM: 300 through 1250.

b. Air Handling Unit:
   1) Operating Mode: Constant cfm.
   2) Input: Motor manufacturer to coordinate control requirements with the control board of the air handling unit.
   3) RPM: 300 through 1250.

c. Condenser Fan:
   1) Operating Mode: Constant speed.
   2) Input: Motor manufacturer to coordinate control requirements with the control board of the condenser fan.
   3) RPM: 300 through 1250.

2. Commercial:
   a. Roof Top Unit:
      1) Operating Mode: Constant speed.
      2) Input: Motor manufacturer to coordinate control requirements with the control board of the roof top unit and/or specified sequence of operation.
      3) Shaft Extension: Single.
      4) RPM: 300 through 1200.

   b. Power Roof Ventilator (PRV):
      1) Operating Mode: Constant cfm.
      2) Input: Motor manufacturer to coordinate control requirements with the control board of the PRV and/or specified sequence of operation.
      3) Shaft Extension: Single.
      4) Options: Remote mount control.

PART 3 EXECUTION

3.01 INSTALLATION

   A. Install in accordance with manufacturer's instructions.
   B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
   C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION 230513
SECTION 230548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Vibration isolators.

1.02 REFERENCE STANDARDS

1.03 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years of experience.

PART 2 PRODUCTS

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

2.02 VIBRATION ISOLATORS
A. Non-Seismic Type:
1. Elastomeric Mounts:
   a. Material: Oil, ozone, and oxidant resistant compounds.
   b. Assembly: Encapsulated load transfer plate bolted to equipment and base plate with anchor hole bolted to supporting structure.
2. Steel Springs:
   a. Assembly: Freestanding, laterally stable without housing.
   b. Leveling Device: Rigidly connected to equipment or frame.
3. Elastomeric Hangers:
   a. Housing: Steel construction containing elastomeric isolation element to prevent rod contact with housing and short-circuiting of isolating function.
   b. Incorporate steel load distribution plate sandwiching elastomeric element to housing.
4. Spring Hanger:
   a. Housing: Steel construction containing stable steel spring and integral elastomeric element preventing metal to metal contact.
   b. Bottom Opening: Sized to allow plus/minus 15 degrees rod misalignment.
5. Thrust Restraints:
   a. Housing: Steel construction containing stable steel spring and integral elastomeric element installed in pairs to resist air pressure thrusts.
   b. Bottom Openings: Sized to allow plus/minus 15 degrees rod misalignment.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL
A. Install in accordance with manufacturer's instructions.
B. Support piping connections to equipment mounted on isolators using isolators or resilient hangers for scheduled distance.

END OF SECTION 230548
SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Nameplates.
B. Adhesive-backed duct markers.
C. Ceiling tacks.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
A. See Section 013000 - Administrative Requirements for submittal procedures.
B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
C. Product Data: Provide manufacturers catalog literature for each product required.
D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS
A. Air Handling Units: Nameplates.
B. Control Panels: Nameplates.
C. Dampers: Ceiling tacks, where located above lay-in ceiling.
D. Ductwork: self adhesive markers.

2.02 NAMEPLATES
A. Manufacturers:
C. Letter Height: 1/4 inch (6 mm).
D. Background Color: Black.
E. Plastic: Conform to ASTM D709.

2.03 CEILING TACKS
A. Description: Steel with 3/4 inch (20 mm) diameter color coded head.
B. Color code as follows:
   1. HVAC Equipment: Yellow.

PART 3 EXECUTION

3.01 PREPARATION
A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION
A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
B. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
C. Install ductwork with adhesive backed markers. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 230553
SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Testing, adjustment, and balancing of air systems.
B. Measurement of final operating condition of HVAC systems.
C. Commissioning activities.

1.02 RELATED REQUIREMENTS
A. Section 019113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.
B. Section 230800 - Commissioning of HVAC.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Submit to Architect.
   2. Submit six weeks prior to starting the testing, adjusting, and balancing work.
   3. Include certification that the plan developer has reviewed the contract documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
   4. Include at least the following in the plan:
      a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      d. Final test report forms to be used.
      e. Expected problems and solutions, etc.
      f. Confirmation of understanding of the outside air ventilation criteria under all conditions.
      g. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
      h. Method of checking building static and exhaust fan and/or relief damper capacity.
      i. False loading of systems to complete TAB work, if specified.
      j. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
      k. Interstitial cavity differential pressure measurements and calculations, if specified.
I. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).

m. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Field Logs: Submit at least twice a week to the Commissioning Authority.

E. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Revise TAB plan to reflect actual procedures and submit as part of final report.
2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
1. AABC (NSTSB), AABC National Standards for Total System Balance.
2. SMACNA (TAB).
3. Maintain at least one copy of the standard to be used at project site at all times.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION
A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
B. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES
A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING
A. Field Logs: Maintain written logs including:
   1. Running log of events and issues.
   2. Discrepancies, deficient or uncompleted work by others.
   4. Lists of completed tests.
B. Ensure recorded data represents actual measured or observed conditions.
C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
D. Mark on the drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE
A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
C. Measure air quantities at air inlets and outlets.
D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

3.07 COMMISSIONING

A. See Sections 019113 - General Commissioning Requirements and 230800 for additional requirements.

B. Perform prerequisites prior to starting commissioning activities.

C. Fill out Prefunctional Checklists for:
   1. Air side systems.
   2. Water side systems.

D. Furnish to the Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.

E. Re-check minimum outdoor air intake flows and maximum and intermediate total airflow rates for ___ percent of the air handlers plus a random sample equivalent to ____ percent of the final TAB report data as directed by Commissioning Authority.
   1. Original TAB agency shall execute the re-checks, witnessed by the Commissioning Authority.
   2. Use the same test instruments as used in the original TAB work.
   3. Failure of more than 10 percent of the re-checked items of a given system shall result in the rejection of the system TAB report; rebalance the system, provide a new system TAB report, and repeat random re-checks.
   4. For purposes of re-check, failure is defined as follows:
      a. Air Flow of Supply and Return: Deviation of more than 10 percent of instrument reading.
      b. Minimum Outside Air Flow: Deviation of more than 20 percent of instrument reading; for inlet vane or VFD OSA compensation system using linear proportional control, deviation of more than 30 percent at intermediate supply flow.
      c. Temperatures: Deviation of more than one degree F (0.5 degree C).
      d. Air and Water Pressures: Deviation of more than 10 percent of full scale of test instrument reading.
      e. Sound Pressures: Deviation of more than 3 decibels, with consideration for variations in background noise.
   5. For purposes of re-check, a whole system is defined as one in which inaccuracies will have little or no impact on connected systems; for example, the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system.

F. In the presence of the Commissioning Authority, verify that:
   1. Final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked.
   2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.
3. The water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full cooling the cooling coil valve of that leg is 90 percent or more open.

END OF SECTION 230593
SECTION 230713 - DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Duct insulation.
   B. Insulation jackets.

1.02 RELATED REQUIREMENTS
   A. Section 230553 - Identification for HVAC Piping and Equipment.
   B. Section 233100 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS
   B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
   I. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
   C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
   B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 10 years of experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
   B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.
1.07 FIELD CONDITIONS
A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS
A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, FLEXIBLE
A. Manufacturer:
   5. Substitutions: See Section 016000 - Product Requirements.
B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. 'K' ('Ksi') Value: 0.36 at 75 degrees F (0.052 at 24 degrees C), when tested in accordance with ASTM C518.
   3. Maximum Water Vapor Absorption: 5.0 percent by weight.
C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
   3. Secure with pressure sensitive tape.
D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
E. Outdoor Vapor Barrier Mastic:
   1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

2.03 GLASS FIBER, RIGID
A. Manufacturer:
   5. Substitutions: See Section 016000 - Product Requirements.
B. Insulation: ASTM C612; rigid, noncombustible blanket.
   1. 'K' ('Ksi') Value: 0.24 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.
   3. Maximum Water Vapor Absorption: 5.0 percent.
   4. Maximum Density: 8.0 lb/cu ft (128 kg/cu m).
C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

E. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight, glass fabric.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.04 JACKETS

   1. Thickness: 0.016 inch (0.40 mm) sheet.
   2. Finish: Smooth.
   3. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.
   4. Fittings: 0.016 inch (0.4 mm) thick die shaped fitting covers with factory attached protective liner.
   5. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.015 inch (0.38 mm) thick aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.
B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Insulated ducts conveying air below ambient temperature:
   1. Provide insulation with vapor barrier jackets.
   2. Finish with tape and vapor barrier jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
C. Insulated ducts conveying air above ambient temperature:
   1. Provide with or without standard vapor barrier jacket.
   2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
D. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet above finished floor) ((below 3 meters above finished floor)): Finish with canvas jacket sized for finish painting.
E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with outdoor jacket finished as specified in Section _______.
F. External Duct Insulation Application:
   1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
   2. Secure insulation without vapor barrier with staples, tape, or wires.
   3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
   4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
   5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

END OF SECTION 230713
SECTION 230800 - COMMISSIONING OF HVAC

PART 1 GENERAL

1.01 SUMMARY

A. See Section 019113 - General Commissioning Requirements for overall objectives; comply with the requirements of Section 019113.

B. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.

C. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.

D. The entire HVAC system is to be commissioned, including commissioning activities for the following specific items:
   1. Control system.
   2. Major and minor equipment items.
   3. Ductwork and accessories.
   4. Variable frequency drives.
   5. Special Ventilation:
      a. Specialty fans.
   6. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

E. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.02 REFERENCE STANDARDS


1.03 SUBMITTALS

A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

B. DRAFT Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
   1. System name.
   2. List of devices.
   3. Step-by-step procedures for testing each controller after installation, including:
      a. Process of verifying proper hardware and wiring installation.
      b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
      c. Process of performing operational checks of each controlled component.
      d. Plan and process for calibrating valve and damper actuators and all sensors.
      e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
   4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has “passed” and is operating within the contract parameters.
   5. Description of the instrumentation required for testing.
6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.

C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.

D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
   1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
   2. Full as-built set of control drawings.
   3. Full as-built sequence of operations for each piece of equipment.
   4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room:
      a. Floor.
      b. Room number.
      c. Room name.
      d. Air handler unit ID.
      e. Reference drawing number.
      f. Air terminal unit tag ID.
      g. Heating and/or cooling valve tag ID.
      h. Minimum air flow rate.
      i. Maximum air flow rate.
   5. Full print out of all schedules and set points after testing and acceptance of the system.
   6. Full as-built print out of software program.
   7. Electronic copy on disk of the entire program for this facility.
   8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
   9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
   10. Control equipment component submittals, parts lists, etc.
   11. Warranty requirements.
   12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
   13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
      a. Sequences of operation.
      b. Control drawings.
      c. Points lists.
      d. Controller and/or module data.
      e. Thermostats and timers.
      f. Sensors and DP switches.
      g. Valves and valve actuators.
      h. Dampers and damper actuators.
      i. Program setups (software program printouts).

E. Project Record Documents: See Section 017800 for additional requirements.
   1. Submit updated version of control system documentation, for inclusion with operation and maintenance data.
   2. Show actual locations of all static and differential pressure sensors (air, water and building pressure) and air-flow stations on project record drawings.

F. Draft Training Plan: In addition to requirements specified in Section 017900, include:
1. Follow the recommendations of ASHRAE Guideline 1.1.
2. Control system manufacturer's recommended training.
3. Demonstration and instruction on function and overrides of any local packaged controls not controlled by the HVAC control system.

G. Training Manuals: See Section 017900 for additional requirements.
   1. Provide three extra copies of the controls training manuals in a separate manual from the O&M manuals.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT
   A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
   B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

PART 3 EXECUTION

3.01 PREPARATION
   A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.
   B. Furnish additional information requested by the Commissioning Authority.
   C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.
   D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.
   E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.
   F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.
   G. Provide temperature and pressure taps in accordance with the contract documents.

3.02 INSPECTING AND TESTING - GENERAL
   A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.
   B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.
   C. Provide two-way radios for use during the testing.
   D. Valve/Damper Stroke Setup and Check:
      1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
      2. Set pump/fan to normal operating mode.
      3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
4. Command valve/damper open; verify position is full open and adjust output signal as required.
5. Command valve/damper to a few intermediate positions.
6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.03 TAB COORDINATION
A. TAB: Testing, adjusting, and balancing of HVAC.
B. Coordinate commissioning schedule with TAB schedule.
C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.
D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.
E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.
F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.04 CONTROL SYSTEM FUNCTIONAL TESTING
A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of the Contract Documents and the detailed Sequences of Operation documentation submittal.
B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with the contract documents.
C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.
D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
   1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Owner.
   2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.
E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.
F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
   1. Setpoint changing features and functions.
   2. Sensor calibrations.
G. Demonstrate to the Commissioning Authority:
   1. That all specified functions and features are set up, debugged and fully operable.
   2. That scheduling features are fully functional and setup, including holidays.
   3. That all graphic screens and value readouts are completed.
   4. Correct date and time setting in central computer.
5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.

6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Owner.

7. Power failure and battery backup and power-up restart functions.

8. Global commands features.

9. Security and access codes.

10. Occupant over-rides (manual, telephone, key, keypad, etc.).

11. O&M schedules and alarms.

12. Occupancy sensors and controls.

13. All control strategies and sequences not tested during controlled equipment testing.

H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

3.05 OPERATION AND MAINTENANCE MANUALS

A. See Section 017800 for additional requirements.

B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.

C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

3.06 DEMONSTRATION AND TRAINING

A. See Section 017900 for additional requirements.

B. Demonstrate operation and maintenance of HVAC system to Owner’s personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.

C. These demonstrations are in addition to, and not a substitute for, Prefunctional Checklists and demonstrations to the Commissioning Authority during Functional Testing.

D. Provide classroom and hands-on training of Owner’s designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the following minimum durations of training:

E. TAB Review: Instruct Owner’s personnel for minimum 2 hours, after completion of TAB, on the following:
   1. Review final TAB report, explaining the layout and meanings of each data type.
   2. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
   3. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
   4. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
   5. Other salient information that may be useful for facility operations, relative to TAB.

F. HVAC Control System Training: Perform training in at least three phases:
1. Phase 1 - Basic Control System: Provide minimum of ____ hours of actual training on the control system itself. Upon completion of training, each attendee, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.
   a. This training may be held on-site or at the manufacturer's facility.
   b. If held off-site, the training may occur prior to final completion of the system installation.
   c. For off-site training, Contractor shall pay expenses of up to two attendees.

2. Phase 2 - Integrating with HVAC Systems: Provide minimum of ____ hours of on-site, hands-on training after completion of Functional Testing. Include instruction on:
   a. The specific hardware configuration of installed systems in this facility and specific instruction for operating the installed system, including interfaces with other systems, if any.
   b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing setpoints and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
   c. Trend logging and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends; provide practice in setting up trend logging and monitoring during training session.
   d. Every display screen, allowing time for questions.
   e. Point database entry and modifications.

3. Phase 3 - Post-Occupancy: Six months after occupancy conduct minimum of ____ hours of training. Tailor training session to questions and topics solicited beforehand from Owner. Also be prepared to address topics brought up and answer questions concerning operation of the system.

G. Provide the services of manufacturer representatives to assist instructors where necessary.

H. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

END OF SECTION 230800
SECTION 231123 - FACILITY NATURAL-GAS PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Pipe, pipe fittings, valves, and connections for natural gas piping systems.

1.02 RELATED REQUIREMENTS
   A. Section 220516 - Expansion Fittings and Loops for Plumbing Piping.

1.03 REFERENCE STANDARDS
   F. ASME B31.9 - Building Services Piping; 2014.
   M. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
   C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.05 QUALITY ASSURANCE
   A. Perform work in accordance with applicable codes.
   B. Valves: Manufacturer's name and pressure rating marked on valve body.
   C. Identify pipe with marking including size, ASTM material classification, and ASTM specification.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
   B. Provide temporary protective coating on cast iron and steel valves.
   C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
   D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
PART 2 PRODUCTS

2.01 NATURAL GAS PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING
A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
   3. Jacket: AWWA C105/A21.5 polyethylene jacket or double layer, half-lapped 10 mil (0.25 mm) polyethylene tape.

2.02 NATURAL GAS PIPING, ABOVE GRADE
A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
   2. Joints: Threaded or welded to ASME B31.1.

2.03 FLANGES, UNIONS, AND COUPLINGS
A. Unions for Pipe Sizes 3 Inches (80 mm) and Under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions.

2.04 PIPE HANGERS AND SUPPORTS
A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.

2.05 BALL VALVES
A. Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze body, 304 stainless steel ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded ends with union.

2.06 PLUG VALVES
A. Construction 2-1/2 Inches (65 mm) and Larger: MSS SP-78, 175 psi (1200 kPa) CWP, cast iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

2.07 LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS
A. Compliance Requirements:
B. Materials in Contact With Gas:
   1. Housing: Aluminum, steel (free of non-ferrous metals).
   2. Seals and Diaphragms: NBR-based rubber.
C. Maximum Inlet Operating Pressure: 5 psi (34.5 kPa).
D. Maximum Body Pressure: 10 psi (1000 mbar).
E. Output Pressure Range: 1 inch wc (2.5 mbar) to 80 inch wc (200 mbar).

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION
A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
E. Group piping whenever practical at common elevations.
F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 220516.
G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
H. Provide access where valves and fittings are not exposed.
I. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
J. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
   4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
   5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.04 APPLICATION
A. Install unions downstream of valves and at equipment or apparatus connections.
B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
C. Provide plug valves in natural gas systems for shut-off service.

END OF SECTION 231123
SECTION 233100 - HVAC DUCTS AND CASINGS

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Metal ductwork.

1.02  RELATED REQUIREMENTS
   A. Section 230593 - Testing, Adjusting, and Balancing for HVAC.
   B. Section 230713 - Duct Insulation: External insulation and duct liner.
   C. Section 233300 - Air Duct Accessories.
   D. Section 233700 - Air Outlets and Inlets.

1.03  REFERENCE STANDARDS
   I. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04  SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data for duct materials.
   C. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for ___________ pressure class and higher systems.
   D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).

1.05  QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.
   B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 20 years of documented experience.

PART 2  PRODUCTS

2.01  DUCT ASSEMBLIES
   A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.
   B. Ducts: Galvanized steel, unless otherwise indicated.
C. Low Pressure Supply (Heating Systems): 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.
D. Low Pressure Supply (System with Cooling Coils): 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.
E. Return and Relief: 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.
F. General Exhaust: 1 inch w.g. (250 Pa) pressure class, galvanized steel.
G. Outside Air Intake: 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.

2.02 MATERIALS
A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
C. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
   2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
D. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.03 DUCTWORK FABRICATION
A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
C. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
E. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.04 MANUFACTURED DUCTWORK AND FITTINGS
A. Flexible Ducts: Two ply vinyl film supported by helically wound spring steel wire.
   1. Pressure Rating: 10 inches WG (2.50 kPa) positive and 1.0 inches WG (250 Pa) negative.
   2. Maximum Velocity: 4000 fpm (20.3 m/sec).
   3. Temperature Range: Minus 10 degrees F to 160 degrees F (Minus 23 degrees C to 71 degrees C).

PART 3 EXECUTION
3.01 INSTALLATION
A. Install, support, and seal ducts in accordance with SMACNA (DCS).
B. Install in accordance with manufacturer's instructions.
C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
D. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
E. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

G. Use double nuts and lock washers on threaded rod supports.

END OF SECTION 233100
SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Combination fire and smoke dampers.
   B. Duct access doors.
   C. Fire dampers.
   D. Flexible duct connections.
   E. Smoke dampers.
   F. Volume control dampers.

1.02 RELATED REQUIREMENTS
   A. Section 230548 - Vibration and Seismic Controls for HVAC Piping and Equipment.
   B. Section 233100 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS
   D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
   E. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data:  Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
   C. Shop Drawings:  Indicate for shop fabricated assemblies including volume control dampers.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications:  Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 COMBINATION FIRE AND SMOKE DAMPERS

2.02 DUCT ACCESS DOORS
   A. Fabricate in accordance with SMACNA (DCS) and as indicated.

2.03 FIRE DAMPERS
   A. Manufacturers:

B. Horizontal Dampers: Galvanized steel, 22 gage, 0.0299 inch (0.76 mm) frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

C. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream except for 1.0 inch (250 Pa) pressure class ducts up to 12 inches (300 mm) in height.

D. Multiple Blade Dampers: 16 gage, 0.0598 inch (1.52 mm) galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 by 1/2 inch (3.2 by 12.7 mm) plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.

E. Fusible Links: UL 33, separate at 160 degrees F (71 degrees C) with adjustable link straps for combination fire/balancing dampers.

2.04 FLEXIBLE DUCT CONNECTIONS

A. Manufacturers:
   2. Substitutions: See Section 016000 - Product Requirements.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Flexible Duct Connections: Fabric crimped into metal edging strip.

2.05 SMOKE DAMPERS

2.06 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Single Blade Dampers:
   1. Blade: 20 gage, _____ inch (___ mm), minimum.

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch (200 by 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
   1. Blade: 18 gage, 0.0478 inch (1.21 mm), minimum.

D. End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

E. Quadrants:
   1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
   3. Where rod lengths exceed 30 inches (750 mm) provide regulator at both ends.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 233100 for duct construction and pressure class.

B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 by 8 inch (200 by 200 mm) size for hand access, size for shoulder access, and as indicated. Provide 4 by 4 inch (100 by 100 mm) for balancing dampers only. Review locations prior to fabrication.
C. Provide fire dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by Authorities Having Jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

D. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.

E. Demonstrate re-setting of fire dampers to Owner’s representative.

F. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

G. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
   1. Refer to Section 230548.

H. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION 233300
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Propeller fans.
   B. Motors and drives.
   C. Accessories.

1.02 RELATED REQUIREMENTS
   A. Section 230513 - Common Motor Requirements for HVAC Equipment.
   B. Section 233300 - Air Duct Accessories: Backdraft dampers.
   C. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
   B. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
   E. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on axial fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.
   C. Shop Drawings: Indicate assembly of axial fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect motors, shafts, and bearings from weather and construction dust.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   C. Twin City Fan & Blower; _____: www.tcf.com/#sle.
   D. Soler and Palau.
   E. Substitutions: See Section 016000 - Product Requirements.

2.02 PROPELLER FANS
   A. Impeller: Shaped steel or steel reinforced aluminum blade with heavy hubs, statically and dynamically balanced, keyed and locked to shaft, directly connected to motor or provided with V-belt drive.
B. Frame: One piece, square steel with die formed venturi orifice, mounting flanges and supports, with baked enamel finish.

C. Accessories:
1. Backdraft Damper: Multiple blade with offset hinge pin, blades linked.
2. Outlet Damper: Multiple blade with offset hinge pin, blades linked, line voltage motor drive, power open, spring return.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install flexible connections specified in Section 233300 between axial fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and axial fan while running.
C. Provide fixed sheaves required for final air balance.
D. Provide safety screen where inlet or outlet is exposed.
E. Provide backdraft dampers on discharge of exhaust fans and as indicated.

END OF SECTION 233413
SECTION 233416 - CENTRIFUGAL HVAC FANS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Backward inclined centrifugal fans.
   B. Bearings and drives.

1.02 RELATED REQUIREMENTS
   A. Section 230513 - Common Motor Requirements for HVAC Equipment.
   B. Section 233300 - Air Duct Accessories: Backdraft dampers.
   C. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
   A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.
   B. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
   E. NEMA MG 1 - Motors and Generators; 2017.
   F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.
   C. Shop Drawings: Indicate assembly of centrifugal fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
   B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Protect motors, shafts, and bearings from weather and construction dust.

1.07 FIELD CONDITIONS
   A. Permanent fans may be used for ventilation during construction only after ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. ACME Engineering and Manufacturing Corporation; ______: www.acmefan.com/#sle.
   B. Loren Cook Company; ______: www.lorencook.com/#sle.
   C. PennBarry, Division of Air System Components; ______: www.pennbarry.com/#sle.
   D. Twin City Fan & Blower; ______: www.tcf.com/#sle.
E. Substitutions: See Section 016000 - Product Requirements.

2.02 WHEEL AND INLET
A. Backward Inclined: Steel or aluminum construction with smooth curved inlet flange, heavy back plate, backwardly curved blades welded or riveted to flange and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

2.03 HOUSING
A. Heavy gage steel, spot welded for AMCA 99 Class I and II fans, and continuously welded for Class III, adequately braced, designed to minimize turbulence with spun inlet bell and shaped cut
B. Factory finish before assembly to manufacturer's standard. For fans handling air downstream of humidifiers, provide two additional coats of paint. Prime coating on aluminum parts is not required.

2.04 BEARINGS AND DRIVES
A. Bearings: Heavy duty pillow block type, selfgreasing ball bearings, with ABMA STD 9 life at 50,000 hours.
B. Shafts: Hot rolled steel, ground and polished, with keyway, protectively coated with lubricating oil, and shaft guard.
C. Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 hp (11.2 Kw) and under, selected so required rpm is obtained with sheaves set at mid Fixed sheave for 20 hp (15 Kw) and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.
D. Belt Guard: Fabricate to SMACNA (DCS); 0.106 inch (2.6 mm) thick, 3/4 inch (20 mm) diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

PART 3 EXECUTION
3.01 INSTALLATION
A. Install in accordance with manufacturer's instructions.
B. Install flexible connections between fan inlet and discharge ductwork; refer to Section 233300. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.
C. Provide fixed sheaves required for final air balance.
D. Provide backdraft dampers on discharge of exhaust fans and as indicated; refer to Section 233300.

END OF SECTION 233416
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Centrifugal fans.
   B. Ductwork and duct accessories.

1.02 RELATED REQUIREMENTS
   A. Section 220548 - Vibration and Seismic Controls for Plumbing Piping and Equipment:  Vibration isolators.
   B. Section 230513 - Common Motor Requirements for HVAC Equipment:  Fan motors.
   C. Section 260583 - Wiring Connections:  Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS
   B. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
   F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
   G. SMACNA (RIDC) - Rectangular Industrial Duct Construction Standards; 2007.
   H. SMACNA (ROUND) - Round Industrial Duct Construction Standards; 2013.

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data:  Provide manufacturers literature and data sheets indicating rated capacities, dimensions, weights and point loadings, accessories, electrical characteristics and connection requirements, wiring diagrams, and location and sizes of field connections.
      1. Provide fan curves with specified operating point clearly plotted.
   C. Shop Drawings:  Indicate dimensions, sizes, weights and point loadings, and locations and sizes of field connections.
   D. Manufacturer's Installation Instructions:  Include assembly and installation instructions.
   E. Operation and Maintenance Data:  Include instructions for fan lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.05 QUALITY ASSURANCE
   A. Fan Performance Ratings:  Determined in accordance with AMCA 210 and labeled with AMCA Certified Rating Seal.
   B. Fan Fabrication:  Conform to AMCA 99.
   C. Products Requiring Electrical Connection:  Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 FIELD CONDITIONS
   A. Permanent exhaust system may not be used for ventilation during construction.
PART 2 PRODUCTS

2.01 MANUFACTURERS
B. Monoxivent: www.monoxivent.com/#sle.
C. Ventaire.
D. Substitutions: See Section 016000 - Product Requirements.

2.02 CENTRIFUGAL FANS
A. Wheel and Inlet: Steel construction with smooth curved inlet flange, heavy back plate, backwardly curved blades welded to flange and back plate; cast iron hub riveted to back plate and keyed to shaft with set screws.
B. Housing: Heavy gage steel, continuously welded with inlet bell and shaped cut-off, factory finished with enamel or prime coat.
C. Motors and Drives:
   1. Motors: As indicated, in compliance with Section 230513.
   2. Bearings: Heavy duty pillow block type, self-aligning, grease-lubricated ball bearings or roller bearings.
   3. Shafts: Hot rolled steel, ground and polished, with key-way, protectively coated with lubricating oil.
   4. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed, variable and adjustable pitch, matched belts, and rated minimum 1.5 times nameplate rating of motor.
   5. Belt Guard: Fabricate to SMACNA (DCS); of 12 gage (2.8 mm), 3/4 inch (20 mm) diamond mesh wire screen welded to steel angle frame or equivalent, prime coated.

2.03 DUCTWORK AND DUCT ACCESSORIES
A. Materials:
   1. Coated Galvanized Steel Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 zinc coating and 4 mil (0.1 mm) polyvinyl chloride coating inside and out.
B. Ductwork:
   1. Fabricate and support in accordance with:
      a. SMACNA (DCS).
      b. SMACNA (RIDC) and SMACNA (ROUND).
      c. ACGIH (IV) - Industrial Ventilation Manual.
   2. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline.
   3. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
   4. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA (ROUND).
   5. Provide standard 45 degree lateral wye branch fittings unless otherwise indicated.
C. Flexible Connectors: UL listed, fire-retardant polyethylene impregnated fabric, minimum density 20 oz per sq yd (0.68 kg per sq m), approximately 2 inches (50 mm) wide, crimped into metal edging strip.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install equipment in accordance with manufacturer's instructions.
B. Install fans with resilient mounting and flexible electrical leads. Refer to Section 220548 and Section 260583.
C. Install flexible connections at fan inlet and discharge. Ensure metal bands of connectors are parallel with minimum 1 inch (25 mm) flex between ductwork and fan while running.

D. Provide pitot tube openings where required for testing of systems, complete with metal cap with spring device or screw to ensure against air leakage.

E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

F. Tape joints of PVC coated metal ductwork with PVC tape. Backfill with sand.

END OF SECTION 233516
SECTION 233700 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Diffusers.
   B. Registers/grilles.
   C. Door grilles.
   D. Louvers.
   E. Louvered penthouses.
   F. Roof hoods.

1.02 RELATED REQUIREMENTS
   A. Section 099123 - Interior Painting: Painting of ducts visible behind outlets and inlets.

1.03 REFERENCE STANDARDS
   F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements for submittal procedures.
   B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.05 QUALITY ASSURANCE
   A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
   B. Test and rate louver performance in accordance with AMCA 500-L.
   C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 RECTANGULAR CEILING DIFFUSERS
   A. Type: Provide square, stamped, multi-core diffuser to discharge air in 360 degree pattern with sectorizing baffles where indicated.
   B. Connections: Round.
   C. Frame: Provide inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame.
   D. Fabrication: Steel with baked enamel finish.
   E. Color: As indicated.

2.02 CEILING SUPPLY REGISTERS/GRILLES
   A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, one-way deflection.
   B. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting and gasket.
C. Construction: Made of aluminum extrusions with factory enamel finish.
D. Color: As indicated.
E. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.03 CEILING EXHAUST AND RETURN REGISTERS/GRILLES
A. Type: Streamlined blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing, with blades set at 45 degrees, vertical face.
B. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting.
C. Fabrication: Steel with 20 gage, 0.0359 inch (0.91 mm) minimum frames and 22 gage, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gage, 0.0359 inch (0.91 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish.
D. Color: As indicated.

2.04 CEILING EGG CRATE EXHAUST AND RETURN GRILLES
A. Type: Egg crate style face consisting of 1/2 by 1/2 by 1/2 inch (13 by 13 by 13 mm) grid core.
B. Fabrication: Grid core consists of aluminum with mill aluminum finish.
C. Color: As indicated.
D. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting.
E. Frame: Channel lay-in frame for suspended grid ceilings.

2.05 WALL SUPPLY REGISTERS/GRILLES
A. Type: Streamlined and individually adjustable blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing with spring or other device to set blades, vertical face, single deflection.
B. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting and gasket.
C. Fabrication: Steel with 20 gage, 0.0359 inch (0.91 mm) minimum frames and 22 gage, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gage, 0.0359 inch (0.91 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish.
D. Color: As indicated.
E. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.06 DOOR GRILLES
A. Type: V-shaped louvers of 20 gage, 0.0359 inch (0.91 mm) thick steel, 1 inch (25 mm) deep on 1/2 inch (13 mm) centers.

2.07 LOUVERS
A. Type: 4 inch (100 mm) deep with blades on 45 degree slope with center baffle and return bend, heavy channel frame, 1/2 inch (13 mm) square mesh screen over exhaust and 1/2 inch (13 mm) square mesh screen over intake.
B. Fabrication: 16 gage, 0.0598 inch (1.52 mm) thick galvanized steel welded assembly, with factory prime coat finish.
C. Color: As indicated.

2.08 LOUVERED PENTHOUSES
A. Type: All welded assembly with 4 inch (100 mm) deep louvers, mitered corners, sheet aluminum roof, with factory prime coat finish.
B. Color: As indicated.
2.09 ROOF HOODS

A. Fabricate of galvanized steel, minimum 16 gage, 0.0598 inch (1.52 mm) base and 20 gage, 0.0359 inch (0.91 mm) hood, or aluminum, minimum 16 gage, 0.0598 inch (1.52 mm) base and 18 gage, 0.0598 inch (1.21 mm) hood; suitably reinforced; with removable hood; birdscreen with 1/2 inch (13 mm) square mesh for exhaust and 3/4 inch (19 mm) for intake, and factory prime coat finish.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.
C. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
D. Install diffusers to ductwork with air tight connection.
E. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
F. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 099123.

END OF SECTION 233700
SECTION 235100 - BREECHINGS, CHIMNEYS, AND STACKS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Type B double wall gas vents.
B. Double wall metal stacks.

1.02  REFERENCE STANDARDS
D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.03  DEFINITIONS
A. Breeching: Vent Connector.
B. Vent: That portion of a venting system designed to convey flue gases directly outdoors from a vent connector or from an appliance when a vent connector is not used.
C. Vent Connector: That part of a venting system that conducts the flue gases from the flue collar of an appliance to a chimney or vent, and may include a draft control device.

1.04  DESIGN REQUIREMENTS
A. Factory built vents and chimneys used for venting natural draft appliances shall comply with NFPA 211 and be UL listed and labeled.

1.05  SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data indicating factory built chimneys, including dimensional details of components and flue caps, dimensions and weights, electrical characteristics and connection requirements.
C. Shop Drawings: Indicate general construction, dimensions, weights, support and layout of breechings. Submit layout drawings indicating plan view and elevations where factory built units are used.

1.06  QUALITY ASSURANCE
A. Designer Qualifications: Design stacks under direct supervision of a Professional Structural Engineer experienced in design of the type of work specified and licensed in the State in which the Project is located.
B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
C. Installer Qualifications: Company specializing in performing the type of work specified in this section with minimum 10 years documented experience, and approved by manufacturer.

PART 2  PRODUCTS

2.01  MANUFACTURERS
B. DuraVent: www.duravent.com/#sle.

E. Substitutions: See Section 016000 - Product Requirements.

2.02 BREECHINGS, CHIMNEYS, AND STACKS - GENERAL REQUIREMENTS

A. Regulatory Requirements:
   1. Conform to applicable code for installation of natural gas burning appliances and equipment.

2.03 TYPE B DOUBLE WALL GAS VENTS

A. Fabrication: Inner pipe of sheet aluminum, and outer pipe of galvanized sheet steel, tested in compliance with UL 441.

B. Electrically Actuated Vent Dampers: Same size as draft hood collar, constructed of stainless steel or galvanized steel, with corrosion-resistant components, in compliance with ANSI Z21.66.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NFPA 54.

C. Install breechings with minimum of joints. Align accurately at connections, with internal surfaces smooth.

D. Support breechings from building structure, rigidly with suitable ties, braces, hangers and anchors to hold to shape and prevent buckling. Support vertical breechings, chimneys, and stacks at 12 foot (4 m) spacing, to adjacent structural surfaces, or at floor penetrations. Refer to SMACNA (DCS) for equivalent duct support configuration and size.

E. Pitch breechings with positive slope up from fuel-fired equipment to chimney or stack.

F. For Type B double wall gas vents, maintain UL listed minimum clearances from combustibles. Assemble pipe and accessories as required for complete installation.

G. Clean breechings, chimneys, and stacks during installation, removing dust and debris.

END OF SECTION 235100
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Forced air furnaces.
B. Controls.

1.02 RELATED REQUIREMENTS
A. Section 231123 - Facility Natural-Gas Piping.
B. Section 230513 - Common Motor Requirements for HVAC Equipment: Additional requirements for fan motors.
C. Section 233100 - HVAC Ducts and Casings.
D. Section 235100 - Breechings, Chimneys, and Stacks: Flue or stack.
E. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
D. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.
E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years of experience and approved by manufacturer.

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

1.07 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Provide three year manufacturers warranty for solid state ignition modules.
C. Provide five year manufacturers warranty for heat exchangers.
PART 2 PRODUCTS

2.01 MANUFACTURERS
B. Trane Inc, a subsidiary of Ingersoll Rand; ______: www.trane.com.
D. Substitutions: See Section 016000 - Product Requirements.

2.02 GAS FIRED FURNACES
A. Annual Fuel Utilization Efficiency (AFUE): 0.78 (“non-condensing”).
B. Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, humidifier, and accessories; wired for single power connection with control transformer.
   1. Safety certified by CSA in accordance with ANSI Z21.47.
   6. Accessories:
      a. Roof termination kit.
C. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner. If not certified for combustible flooring, please provide additional steel base.
D. Heat Exchanger:
   2. Shape: Tubular type.
E. Gas Burner:
   1. Atmospheric type with adjustable combustion air supply.
   2. Gas valve, two stage provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
   3. Electronic pilot ignition, with electric spark igniter.
   4. Combustion air damper with synchronous spring return damper motor.
   5. Non-corrosive combustion air blower with permanently lubricated motor.
F. Gas Burner Safety Controls:
   1. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
   2. Flame rollout switch: Installed on burner box and prevents operation.
   3. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
   4. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.
G. Supply Fan: Centrifugal type rubber mounted with direct drive with adjustable variable pitch motor pulley.
H. Motor:
   1. 1750 rpm single-speed, permanently lubricated, hinge mounted.
I. Air Filters: 1 inch (25 mm) thick glass fiber, disposable type arranged for easy replacement.
J. Operating Controls:
   1. Room Thermostat: Cycles burner to maintain room temperature setting.
2. Supply Fan Control: Energize from bonnet temperature independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation.

2.03 THERMOSTATS
   A. Room Thermostat: Low voltage, controlling heat and fan to maintain temperature setting; with system selector switch (heat-off) and fan control switch (auto-off).

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
   B. Verify that proper power supply is available and located correctly.
   C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions and requirements of authorities having jurisdiction.
   B. Install in accordance with NFPA 90A.
   C. Install gas fired furnaces in accordance with NFPA 54.
   D. Provide vent connections in accordance with NFPA 211.

END OF SECTION 235400
SECTION 235523 - GAS-FIRED RADIANT HEATERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 QUALITY ASSURANCE

A. AGA Compliance: Heaters shall be “design certified” and shall bear the AGA seal.

B. ANSI Compliance: Comply with ANSI Z83.20 or ANSI Z83.19A, as applicable

1.03 SUBMITTALS

A. General: Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a submitted item does not comply fully with each and every requirement of the Specifications, the submittal shall clearly indicate such deviations. Identification requirements for non-complying features of items are very specific. See Section 230210 for exact requirements.

B. Manufacturer's Data: Submit manufacturer's technical product data including dimensions, weights, required clearances and access, flow capacity including initial and final pressure drop at rated air flow, efficiency and test method, fire classification, and installation instructions.

PART 2 - PRODUCTS

2.01 TUBULAR INFRARED HEATERS

A. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.20.

B. Fuel Type: Design burner for natural or propane gas as indicated on the Drawings.

C. Combustion Tubing: 4-inch-diameter stainless steel with high-emissivity, high-temperature, corrosion-resistant external finish.

D. Tubing Connections: Stainless-steel couplings or flared joints with stainless-steel draw bolts.

E. Reflector: Polished aluminum, 97 percent minimum reflectivity, with end caps. Shape to control radiation from tubing for uniform intensity at floor level with 100 percent cutoff above centerline of tubing. Provide for rotating reflector or heater around a horizontal axis for minimum 30-degrees tilt from vertical.

F. Reflector Extension Shields: Same material as reflectors, arranged for fixed connection to lower reflector lip and rigid support to provide 100 percent cutoff of direct radiation from tubing at angles greater than 30 degrees from vertical.

G. Burner Safety Controls:

1. Gas Control Valve: Single-stage, regulated redundant 24-V ac gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.

2. Blocked Vent Safety: Differential pressure switch in burner safety circuit to stop burner operation with high discharge or suction pressure.

3. Control Panel Interlock: Stops burner if panel is open.


5. Retain one of first three paragraphs and associated subparagraphs below, or revise to suit selected equipment.

H. Burner and Emitter Type: Gravity-vented power burner with electronic spark and electronic flame safety and the following features:

1. Emitter Tube: 4-inch-diameter, aluminized-steel tubing with sight glass for burner and pilot flame observation.

2. Venting: Connector at exit end of emitter tubing for vent-pipe connection.

I. Balancing Dampers: Plate type, mounted in cast, double-flange fitting with vacuum test plug.
2.02 VENTING:
   A. Vent heaters in compliance with Section 235100, full size of heater connection.

2.03 CONTROLS:
   A. Provide low voltage 2-stage thermostat, wall-mounting type, with 50 to 90 deg F operating range. Included integrally mounted control transformer:

PART 3 - EXECUTION

3.01 INSTALLATION
   A. Install heaters as indicated on the Drawings. Locate heaters as indicated with heater reflector at elevation above finished floor as indicated. Heater shall be plumb and level.
   B. Install and connect gas-fired radiant heaters and associated fuel and vent features and systems according to NFPA 54 and manufacturer's written installation instructions.
   C. Provide chain sets with S-Hooks for hanging heaters, along with any auxiliary structural steel hangers, bridging, supports, etc. required to hang heaters from the building structure. Suspend from building structure using chain hanger kits and building attachments in accordance with Section 230529.
   D. Maintain manufacturers' recommended clearances to combustibles.
   E. Extend gas piping to within 5’ from unit, provide drop with manual gas shutoff valve, 1/8" NPT plugged test connection, tee, and drip pocket. Locate piping drop so as to not interfere with service of unit. Extend gas piping runout, full size of gas train inlet, from tee to gas train connection, provide union with sufficient clearance for unit removal and service.

3.02 OWNER INSTRUCTION AND TRAINING
   A. Provide Owner 1/2 hour of instruction and training on O&M and operating controls.

END OF SECTION 235523
SECTION 235533 - FUEL-FIRED UNIT HEATERS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Gas fired unit heaters.
B. Room thermostats.

1.02 RELATED REQUIREMENTS
A. Section 230513 - Common Motor Requirements for HVAC Equipment: Fan motors.
B. Section 230548 - Vibration and Seismic Controls for HVAC Piping and Equipment.
C. Section 235100 - Breechings, Chimneys, and Stacks.
D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's literature and data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
C. Shop Drawings: Indicate assembly, required clearances, and locations and sizes of field connections.
D. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.
E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listing.
F. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

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

1.07 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Provide five year manufacturers warranty for heat exchangers.

PART 2 PRODUCTS

2.01 GAS FIRED UNIT HEATERS
A. Manufacturers:

18059.000 / 05/18 FUEL-FIRED UNIT HEATERS 235533 - 1

B. Unit Heaters: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heat exchanger, burner, controls, and accessories:
   2. Discharge Louvers: Individually adjustable horizontal and vertical louvers to match cabinet finish.

C. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors, glass fiber insulation and reflective liner.

D. Supply Fan: Propeller type with direct drive, variable pitch motor pulley.

E. Heat Exchanger: Aluminized steel welded construction.

F. Gas Burner:
   1. Atmospheric type with adjustable combustion air supply,
   2. Gas valve, two stage provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
   3. Electronic pilot ignition, with electric spark igniter.

G. Gas Burner Safety Controls:
   1. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
   2. Flame rollout switch: Installed on burner box and prevents operation.
   3. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
   4. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.

H. Operating Controls
   1. Room Thermostat: Cycles burner to maintain room temperature setting.

I. Performance:
   1. Ratings: Energy Efficiency Rating (EER)/Coefficient of Performance (COP) not less than requirements of ASHRAE Std 90.1 I-P; seasonal efficiency to ASHRAE Std 103.

2.02 ROOM THERMOSTATS
A. Manufacturers:
B. Room Thermostat: Adjustable, low voltage, to control burner operation, and supply fan to maintain temperature setting. Include a wall mounted manual fan switch for summer fan operation.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that space is ready for installation of units and openings are as indicated on shop drawings.
B. Verify that proper power supply is available.
C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION
A. Install in accordance with NFPA 90A.
B. Install gas fired units in accordance with NFPA 54 and applicable codes.
C. Provide vent connections in accordance with NFPA 211. Refer to Section 235100.
D. Install unit heaters with vibration isolation. Refer to Section 230548.
E. Provide connection to electrical power systems; refer to Section 260583.

END OF SECTION 235533
SECTION 237339 - DIRECT GAS-FIRED INDUSTRIAL HEATING AND VENTILATING UNITS

PART 1  GENERAL

1.01  RELATED DOCUMENTS

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

1.02  SUMMARY

A. This Section includes horizontal, direct-fired, heating and ventilating units, designed for mounting inside the building (as scheduled).

1.03  SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection. Prepare the following:
   1. Mounting Details: For mounting and securing to concrete pad.
   2. Wiring Diagrams: Power, signal, and control wiring.

C. Startup service reports. At time of shipment provide copies of factory start-up and testing reports for each unit.

D. Operation and Maintenance Data: For direct-fired heating and ventilating units to include in emergency, operation, and maintenance manuals.

1.04  MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Filters: Two set(s) of both types of filters for each unit.

1.05  QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of direct-fired heating and ventilating units and are based on the specific system indicated. Refer to Section 016000 "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

E. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

F. Unit must comply and be built in conformance with NFPA-54, ETL/UL design certified, and listed to ANSI Z83.18b-2008 standards

G. Burners shall be designed to not exceed the contaminant threshold limits as established by OSHA and ACGIH

H. Furnish proof of having manufactured temperature modulating direct gas-fired OA/RA space heating systems for a minimum of 10 years

I. Make the manufacturing facility available to the Owner/Engineer for a quality control audit without prior notification

1.06  COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. CambridgeEngineering Inc., Chesterfield, MO
2. Rapid Engineering-Grand Rapids, MI
3. Hastings Industries; Division of Eric, Inc
4. Reznor-Thomas & Betts Corporation; Mechanical Products Division
5. If the Contractor wishes to substitute equipment they shall be responsible for the cost of any and all changes that may affect other Trades

2.02 PACKAGED UNITS
A. Factory-assembled, pre-wired, self-contained unit consisting of cabinet, supply fan, controls, filters, and direct-fired gas furnace for installation inside or outside the building (as scheduled).

2.03 CABINET
A. Cabinet: 1" insulated 1-1/2# density fiberglass matt-faced insulation Double-wall 18 gauge galvanized or aluminized steel panels formed to ensure rigidity and supported by galvanized-steel channels or structural channel supports with lifting lugs. Cabinet shall be fully weatherized for outside installation.
   1. Cabinet fabricated of 18-gauge aluminized steel.
   2. Interior liner shall be constructed of 22-gauge aluminum liner
   3. Rigid welded frame. (units that utilize zip screws in the manufacture of the units are not acceptable
B. Access Panels: Weather-resistant, easy access hinged access doors with Ventlok handles and lock open braces for complete access to furnace, fan motor assemblies, and filter section
C. Internal Insulation: Fibrous-glass duct lining, 1-inch thick, 1-1/2 pound density.
E. Discharge: Horizontal-pattern, galvanized-steel assembly with diffusers incorporating individually adjustable vanes.

2.04 SUPPLY-AIR FAN
A. Fan Type: Centrifugal, double-width, double- inlet forward-curved fan rated according to AMCA 210; statically and dynamically balanced, galvanized steel; mounted on solid-steel shaft with heavy-duty, self-aligning, grease-lubricated pillow block ball bearings.
B. Fan Bearings: Rated to a minimum of 100,000 hours (L-10 Life).
C. Motor: Open drip-proof single-speed motor.
D. Drive: V-belt drive with matching fan pulley and adjustable motor sheaves and belt assembly.
E. Mounting: Fan wheel, motor, and drives shall be mounted in fan casing with spring isolators.

2.05 OUTSIDE-AIR INTAKE
A. Outside-Air Intake: On side or bottom of unit (as indicated), with bird screen, and finish to match cabinet; and sized to supply maximum 100 percent outside air.

2.06 AIR FILTERS
A. Comply with NFPA 90A. Two separate sets of filters.
B. Cleanable Filters: 1-inch- thick, cleanable metal mesh. Provide filter face area for 300 FPM maximum.
C. Pleated Panel Filters: 2-inch- thick, extended surface, pleated-panel-type, with holding frames, with a minimum efficiency value of MERV 8 according to ASHRAE 52.2 and 90 percent average arrestance according to ASHRAE 52.1. Provide filter face area for 300 FPM maximum.
D. 1" x 3" 16-gauge wire metal screen shall be provided downstream of the filters to ensure that the filters will not enter the burner and fan section in the case of a collapsed filter.

E. Both air streams (outside and return air) shall be filtered by both sets of filters.

2.07 DAMPERS

A. Outside-Air and Return-Air Damper: Galvanized-steel, opposed-blade dampers with vinyl blade seals and stainless-steel jamb seals, having a maximum leakage of 5 cfm/sq. ft. of damper area, at differential pressure of 2-inch wg.
   1. Dampers arranged to provide a minimum of 20 percent outside air / 80 percent return air and 100 percent outside air / 0 percent return air. Damper operation shall be fully modulating.

B. Damper Operator: Direct coupled, electronic with spring return as required by the control sequence.

2.08 DIRECT-FIRED GAS FURNACE

A. Description: Factory assembled, piped, and wired; and complying with ANSI Z83.4, "Direct Gas-Fired Make-Up Air Heaters"; ANSI Z83.18, "Direct Gas-Fired Industrial Air Heaters"; and NFPA 54, "National Fuel Gas Code."

B. Burners: Cast-iron burner with stainless-steel mixing plates.
   1. Control Valve: Modulating with minimum turndown ratio of 30:1.
   3. Pilot: the direct fired burner system shall include a direct spark ignition system that includes an ignition module, spark igniter, and a flame rod or UV scanner system to verify burner status before allowing the main gas valve to open.
   4. No air from the indoor space shall be allowed to recirculate across the burner at any time. Service of the flame rod and burner igniter shall be accomplished thru an access door.
   5. Burner profile adjustment system shall provide a means to automatically adjust the pressure differential across the burner profile while the fan is operating.

C. Safety Controls:
   1. Gas Manifold: Safety switches and controls to comply with ANSI standards.
   3. Airflow Proving Switch: Dual pressure switch senses correct airflow before energizing pilot and requires airflow to be maintained within minimum and maximum pressure settings across burner.
   5. Gas Train: Redundant, automatic main gas valves, electric pilot valve, electronic-modulating temperature control valve, main and pilot gas regulators, main and pilot manual shutoff valves, main and pilot pressure taps, and high-low gas pressure switches.
   6. Safety Lockout Switch: Locks out ignition sequence if burner fails to light after three tries. Controls are reset manually by turning the unit off and on.
   7. Control Transformer: Integrally mounted 24-V ac.

2.09 CONTROLS

A. Factory-wired, fuse-protected control transformer, connection for power supply and field-wired unit to remote control panel.

B. Control Panel: Surface-mounted remote panel, with engraved plastic cover, and the following lights and switches:
   1. Summer-Off-Winter switch.
   2. Supply-fan operation indicating light.
   3. Heating operation indicating light.
   4. Damper position potentiometer.
5. Room thermostat.
6. Dirty-filter indicating light operated by unit-mounted differential pressure switch for both sets of filters.
7. Safety-lockout indicating light.
8. Burner lockout Flame Reset Switch: Allows the flame relay to be reset at the remote panel via momentary push button switch if an unusual condition locks out the burner.

C. Refer to Section 230900 "Automatic Control Systems for HVAC" for control equipment and Section 230990 "Automatic Control Sequences for HVAC" for control sequences of operation.

D. Control Devices:
   2. Mild Weather Thermostat: Adjustable thermostat (-15 °F to 90 °F) that will automatically turn off the burner when the outdoor air temperature rises above the stat set-point. The burner reignites if the temperature falls below set-point. The mild weather sensor shall be located in the outside air stream of the unit and factory set at 65 °F.

E. Outside-Air, and Return-Air Damper Control:
   1. Outside-air damper shall open (to minimum) when supply fan starts, and close when fan stops.
   2. Outside-air damper shall modulate from minimum to maximum (return-air dampers shall move in opposition) to provide economizer cooling to maintain space thermostat set-point temperature.

F. Temperature Control: Operates gas valve to maintain space temperature set-point.
   1. Direct-fired burner gas valve modulates to maintain space temperature.

G. Packaged Unit Controls: Stand-alone control module for packaged unit controls. Coordinated controls and control sequence with Division 23 Sections "Automatic Control System for HVAC," and "Automatic Control Sequences for HVAC."

2.10 MOTORS
   A. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.11 SERVICE PLATFORM
   A. 36" wide work platform the full width of the unit
   B. 42 " railing, 4" high toe kick, and heavy duty galvanized chain access with spring clasps
   C. Ladder shall be provided to access the platform. Rungs shall be constructed of ¾" corrugated steel on 12" center
      1. Paint OSHA yellow with walk-thru style top hand rails and OSHA climbing cage
      2. Final height shall be modified for the height of the landing pad
      3. Access system shall be certified to meet ANSI A14.3, OSHA 1910.27/ 1926.1053 standards

2.12 SUPPORT LEGS
   A. 11-gauge aluminized steel to match unit color
   B. The four (4) heavy duty structural legs shall be used to support the weight of the unit
   C. Legs shall be ship loose field installed by the Mechanical Contractor

2.13 CAPACITIES AND CHARACTERISTICS. REFER TO DRAWINGS AND SCHEDULES.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation of direct-fired H&V units.
B. Examine roughing-in for piping, ducts, and electrical systems to verify actual locations of connections before equipment installation.
C. Examine concrete equipment supports for suitable conditions where units will be installed.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION
A. Install gas-fired units according to NFPA 54, "National Fuel Gas Code."
B. Install controls and equipment shipped by manufacturer for field installation with direct-fired heating and ventilating units.

3.03 CONNECTIONS
A. Piping Connections: Drawings indicate general arrangement of piping, fittings, and specialties. Install piping adjacent to machine to allow service and maintenance.
B. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to direct-fired heating and ventilating units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."
C. Ground equipment according to Division 26 Sections.
D. Connect wiring according to Division 26 Sections.
E. STARTUP SERVICE
F. Engage a factory-authorized service representative to perform startup service.
G. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
   1. Inspect for visible damage to furnace combustion chamber.
   2. Inspect casing insulation for integrity, moisture content, and adhesion.
   3. Verify that clearances have been provided for servicing.
   4. Verify that controls are connected and operable.
   5. Verify that filters are installed.
   6. Purge gas line.
   7. Inspect and adjust vibration isolators.
   8. Verify bearing lubrication.
   9. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
   10. Adjust fan belts to proper alignment and tension.
   11. Start unit according to manufacturer's written instructions.
   12. Complete startup sheets and attach copy with Contractor's startup report.
   13. Inspect and record performance of interlocks and protective devices; verify sequences.
   14. Operate unit for run-in period recommended by manufacturer.
   15. Perform the following operations for both minimum and maximum firing and adjust burner for peak efficiency:
      a. Measure gas pressure on manifold.
      b. Measure combustion-air temperature at inlet to combustion chamber.
      c. Measure supply-air temperature and volume when burner is at maximum firing rate and when burner is off. Calculate useful heat to supply air.
   17. Adjust and inspect high-temperature limits.
   18. Inspect dampers, if any, for proper stroke and interlock with return-air dampers.
   19. Inspect controls for correct sequencing of heating, mixing dampers, and normal and emergency shutdown.
20. Measure and record airflow. Plot fan volumes on fan curve.
21. Verify operation of remote panel, including pilot-operation and failure modes. Inspect the following:
   a. High-limit heat.
   b. Alarms.
22. After startup and performance testing, change filters, verify bearing lubrication, and adjust belt tension.

H. Remove and replace malfunctioning components that do not pass tests and inspections and retest as specified above.
I. Prepare written report of the results of startup services.

3.04 ADJUSTING
   A. Adjust initial temperature set points.
   B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.05 DEMONSTRATION
   A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain direct-fired H&V units. Refer to Division 01 Sections for requirements.

END OF SECTION 237339
SECTION 237413 - PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Packaged roof top unit.
B. Unit controls.
C. Roof mounting curb and base.
D. Maintenance service.

1.02 RELATED REQUIREMENTS
A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
C. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
D. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.
E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.07 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.01 MANUFACTURERS
B. Lennox Ind..
C. Ruud.
D. Substitutions: See Section 016000 - Product Requirements.
2.02 MANUFACTURED UNITS
   A. General: Roof mounted units having gas burner and electric refrigeration.
   B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet
      and frame, supply fan, return fan, heat exchanger and burner, heat recovery coil, controls, air
      filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.

2.03 FABRICATION
   A. Cabinet: Steel with baked enamel finish, including access doors with piano hinges and locking
      handle. Structural members shall be minimum 18 gage, 0.0478 inch (1.21 mm), with access
      doors or panels of minimum 20 gage, 0.0359 inch (0.91 mm).
   B. Insulation: one inch (25 mm) thick neoprene coated glass fiber with edges protected from
      erosion.
   C. Heat Exchangers: Aluminized steel, of welded construction.
   D. Supply and Exhaust Fan: Forward curved centrifugal type, resiliently mounted with V-belt
      drive, adjustable variable pitch motor pulley, and rubber isolated hinge mounted high efficiency
      motor or direct drive as indicated. Refer to Section 220548.
   E. Air Filters: 1. 2 inch (50 mm) thick glass fiber disposable media in metal frames.
   F. Roof Mounting Curb: 14 inches (350 mm) high galvanized steel, channel frame with gaskets,
      nailer strips.

2.04 BURNER
   A. Gas Burner: Induced draft type burner with adjustable combustion air supply, pressure
      regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing
      device, and automatic 100 percent shut-off pilot.
   B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent
      opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize
      blower motor, and after air flow proven and slight delay, allow gas valve to open.
   C. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting,
      de-energize burner on excessive bonnet temperature and energize burner when temperature
      drops to lower safe value.

2.05 EVAPORATOR COIL
   A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.
   B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons (21 kw) capacity
      and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons (26
      kw) cooling capacity and larger.

2.06 COMPRESSOR
   A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive
      lubrication, crankcase heater, high and low pressure safety controls, motor overload protection,
      suction and discharge service valves and gage ports, and filter drier.
   B. Five minute timed off circuit to delay compressor start.

2.07 CONDENSER COIL
   A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil guard.
   B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload
      protection, wired to operate with compressor. Provide high efficiency fan motors.
2.08 OPERATING CONTROLS
   A. Provide low voltage, adjustable room thermostat to control heater stages in sequence with
delay between stages, compressor and condenser fan, and supply fan to maintain temperature
setting.
      1. Include system selector switch (heat-off-cool) and fan control switch (auto-on).
   B. Provide low limit thermostat in supply air to close outside air damper and stop supply fan.

2.09 HEAT RECOVERY COIL
   A. Provide copper tube aluminum fin coil assembly with multiple circuits arranged to provide heat
recovery.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop
drawings.
   B. Verify that proper power supply is available.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Install in accordance with NFPA 90A.
   C. Mount units on factory built roof mounting curb providing watertight enclosure to protect
ductwork and utility services. Install roof mounting curb level.

3.03 SYSTEM STARTUP
   A. Prepare and start equipment. Adjust for proper operation.

3.04 CLOSEOUT ACTIVITIES
   A. Demonstrate operation to Owner's maintenance personnel.

3.05 MAINTENANCE
   A. Provide service and maintenance of packaged roof top units for one year year from Date of
Substantial Completion.
   B. Provide routine maintenance service with a two month interval as maximum time period
between calls.
   C. Include maintenance items as outlined in manufacturer's operating and maintenance data,
including minimum of six filter replacements, minimum of one fan belt replacement, and
controls check-out, adjustments, and recalibration.
   D. After each service call, submit copy of service call work order or report that includes
description of work performed.

END OF SECTION 237413
SECTION 260505 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 3 EXECUTION

1.01 EXAMINATION
A. Verify field measurements and circuiting arrangements are as indicated.
B. Verify that abandoned wiring and equipment serve only abandoned facilities.
C. Demolition drawings are based on casual field observation.
D. Report discrepancies to Architect before disturbing existing installation.
E. Beginning of demolition means installer accepts existing conditions.

1.02 PREPARATION
A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
B. Coordinate utility service outages with utility company.
C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make swichovers and connections. Minimize outage duration.
   1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.

1.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK
A. Remove, relocate, and extend existing installations to accommodate new construction.
B. Remove abandoned wiring to source of supply.
C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
E. Disconnect and remove abandoned panelboards and distribution equipment.
F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
H. Repair adjacent construction and finishes damaged during demolition and extension work.
I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

1.04 CLEANING AND REPAIR
A. See Section 017419 - Construction Waste Management and Disposal for additional requirements.
B. Clean and repair existing materials and equipment that remain or that are to be reused.
C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION 260505
SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Wire pulling lubricant.
- G. Cable ties.

1.02 RELATED REQUIREMENTS
- A. Section 078400 - Firestopping.
- B. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS
- H. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Metal-clad cable is permitted only as follows:
   1. Where not otherwise restricted, may be used:
      a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
         1) Maximum Length: 6 feet (1.8 m).
      b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
         1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
D. Comply with NEMA WC 70.
E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
G. Conductors for Grounding and Bonding: Also comply with Section 260526.
H. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.
I. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
K. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
      a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
   3. Color Code:
      a. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      c. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.

2.03 SINGLE CONDUCTOR BUILDING WIRE
A. Description: Single conductor insulated wire.
B. Conductor Stranding:
   1. Feeders and Branch Circuits:
      b. Size 8 AWG and Larger: Stranded.
C. Insulation Voltage Rating: 600 V.
D. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.04 METAL-CLAD CABLE
A. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
B. Conductor Stranding:
   2. Size 8 AWG and Larger: Stranded.
C. Insulation Voltage Rating: 600 V.
D. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
E. Provide dedicated neutral conductor for each phase conductor where indicated or required.
F. Grounding: Full-size integral equipment grounding conductor.
G. Armor: Steel, interlocked tape.

2.05 WIRING CONNECTORS
A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
B. Connectors for Grounding and Bonding: Comply with Section 260526.
C. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
   2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
D. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
   4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
   5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
H. Mechanical Connectors: Provide bolted type or set-screw type.
I. Compression Connectors: Provide circumferential type or hex type crimp configuration.
J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.06 WIRING ACCESSORIES
A. Electrical Tape:
   1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
   2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
   3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous
temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.

4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).

5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil (0.18 mm); suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil (2.3 mm).

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated without specific routing, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location indicated.
   5. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
      a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
      b. Increase size of conductors as required to account for ampacity derating.
      c. Size raceways, boxes, etc. to accommodate conductors.
   6. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Install metal-clad cable (Type MC) in accordance with NECA 120.
E. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer’s recommended maximum pulling tension and sidewall pressure.
4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

G. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.

H. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
   a. Use listed fittings.
   b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

I. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

K. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

L. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.
4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

M. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
   a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
   b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
   a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
   b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

N. Insulate ends of spare conductors using vinyl insulating electrical tape.
O. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

P. Identify conductors and cables in accordance with Section 260553.
Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
R. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL
A. See Section 014000 - Quality Requirements, for additional requirements.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION 260519
SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Grounding and bonding requirements.
B. Conductors for grounding and bonding.
C. Connectors for grounding and bonding.
D. Ground bars.
E. Ground rod electrodes.

1.02 RELATED REQUIREMENTS
A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS
A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Verify exact locations of underground metal water service pipe entrances to building.
   2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
B. Sequencing:
   1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 SUBMITTALS
A. See Section 013000 - Administrative Requirements for submittals procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
      b. Install grounding electrode conductors in raceway. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
   2. Metal Underground Water Pipe(s):
      a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet (3.0 m) at an accessible location not more than 5 feet (1.5 m) from the point of entrance to the building.
      b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
      c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
   3. Concrete-Encased Electrode:
      a. Provide connection to concrete-encased electrode consisting of not less than 20 feet (6.0 m) of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
   4. Ground Rod Electrode(s):
      a. Provide single electrode unless otherwise indicated or required.
      b. Space electrodes not less than 10 feet (3.0 m) from each other and any other ground electrode.
      c. Where location is not indicated, locate electrode(s) at least 5 feet (1.5 m) outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
   5. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
      a. Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.
      b. Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.
      c. Ground Bar Mounting Height: 18 inches (450 mm) above finished floor unless otherwise indicated.

F. Service-Supplied System Grounding:
   1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

G. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
   a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
   b. Metal gas piping.
8. Provide bonding for interior metal air ducts.

2.02 GROUNDING AND BONDING COMPONENTS
A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
1. Use insulated copper conductors unless otherwise indicated.
   a. Exceptions:
      1) Use bare copper conductors where installed underground in direct contact with earth.
      2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

D. Ground Bars:
1. Description: Copper rectangular ground bars with mounting brackets and insulators.
2. Size: As indicated.
3. Holes for Connections: As indicated or as required for connections to be made.

E. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
3. Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Perform work in accordance with NECA 1 (general workmanship).
C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
D. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
E. Identify grounding and bonding system components in accordance with Section 260553.

3.02 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.
B. Inspect and test in accordance with NETA ATS except Section 4.
C. Perform inspections and tests listed in NETA ATS, Section 7.13.
D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION 260526
SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1  GENERAL

1.01  SECTION INCLUDES
  A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02  RELATED REQUIREMENTS
  A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
  B. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
  C. Section 265100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
  D. Section 265600 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03  REFERENCE STANDARDS
  D. MFMA-4 - Metal Framing Standards Publication; 2004.
  E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
  F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04  ADMINISTRATIVE REQUIREMENTS
  A. Coordination:
     1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
     2. Coordinate the work with other trades to provide additional framing and materials required for installation.
     3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
     4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
     5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
  B. Sequencing:
     1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.05  QUALITY ASSURANCE
  A. Comply with NFPA 70.
  B. Comply with applicable building code.
  C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of ____. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

F. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
   1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
   3. Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.

G. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
PART 3  EXECUTION

3.01  EXAMINATION
   A. Verify that field measurements are as indicated.
   B. Verify that mounting surfaces are ready to receive support and attachment components.
   C. Verify that conditions are satisfactory for installation prior to starting work.

3.02  INSTALLATION
   A. Install products in accordance with manufacturer's instructions.
   B. Perform work in accordance with NECA 1 (general workmanship).
   C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
   E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
   F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
   G. Equipment Support and Attachment:
      1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
      2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
      3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
      4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 033000.
      5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
   H. Conduit Support and Attachment: Also comply with Section 260533.13.
   I. Interior Luminaire Support and Attachment: Also comply with Section 265100.
   J. Exterior Luminaire Support and Attachment: Also comply with Section 265600.
   K. Secure fasteners according to manufacturer's recommended torque settings.
   L. Remove temporary supports.

3.03  FIELD QUALITY CONTROL
   A. See Section 014000 - Quality Requirements, for additional requirements.
   B. Inspect support and attachment components for damage and defects.
   C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
   D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION 260529
SECTION 260533.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).
B. PVC-coated galvanized steel rigid metal conduit (RMC).
C. Flexible metal conduit (FMC).
D. Liquidtight flexible metal conduit (LFMC).
E. Electrical metallic tubing (EMT).
F. Conduit fittings.
G. Accessories.

1.02  RELATED REQUIREMENTS

A. Section 078400 - Firestopping.
B. Section 260526 - Grounding and Bonding for Electrical Systems.
C. Section 260529 - Hangers and Supports for Electrical Systems.
D. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.

1.03  REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.
B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
F. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2005 (Reaffirmed 2013).
G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
H. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
I. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
K. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
L. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.04  ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer’s instructions.

PART 2 PRODUCTS
2.01 CONDUIT APPLICATIONS
   A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
   B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
   C. Underground:
      1. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
      2. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
   D. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
   E. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
   F. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
   G. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
   H. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
      1. Locations subject to physical damage include, but are not limited to:
         a. Where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.
         b. Where exposed below 20 feet (6.1 m) in warehouse areas.
   I. Exposed, Exterior: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.
   J. Connections to Vibrating Equipment:
      1. Dry Locations: Use flexible metal conduit.
      2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
      3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
      4. Vibrating equipment includes, but is not limited to:
         a. Transformers.
         b. Motors.
   K. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.
2.02 CONDUIT REQUIREMENTS
A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
B. Electrical Service Conduits: Also comply with Section 262100.
C. Fittings for Grounding and Bonding: Also comply with Section 260526.
D. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
E. Provide products listed, classified, and labeled as suitable for the purpose intended.
F. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4 inch (21 mm) trade size.
   2. Branch Circuit Homoeruns: 3/4 inch (21 mm) trade size.
G. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)
A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)
A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil (1.02 mm).
C. PVC-Coated Fittings:
   1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
   2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil (1.02 mm).
D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil (0.38 mm).

2.05 FLEXIBLE METAL CONDUIT (FMC)
A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)
A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.

### 2.07 Electrical Metallic Tubing (EMT)

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.

### 2.08 Accessories

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).

### PART 3 EXECUTION

#### 3.01 Examination

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 Installation

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

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.

E. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
   4. Arrange conduit to maintain adequate headroom, clearances, and access.
   5. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
   6. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
   7. Route conduits above water and drain piping where possible.
   8. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
   9. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
10. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
   a. Heaters.
   b. Hot water piping.
   c. Flues.
11. Group parallel conduits in the same area together on a common rack.

F. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   4. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
   5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
   6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
   7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
   8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).

G. Connections and Terminations:
   1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Use suitable adapters where required to transition from one type of conduit to another.
   4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
   5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
   6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
   7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

H. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Make penetrations perpendicular to surfaces unless otherwise indicated.
   3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   4. Conceal bends for conduit risers emerging above ground.
   5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
   6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
   7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

I. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where conduits are subject to earth movement by settlement or frost.

J. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

K. Provide grounding and bonding in accordance with Section 260526.

3.03 FIELD QUALITY CONTROL
   A. See Section 014000 - Quality Requirements, for additional requirements.
   B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
   C. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
   D. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING
   A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION
   A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION 260533.13
SECTION 260533.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).
C. Underground boxes/enclosures.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete.
B. Section 083100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
C. Section 260529 - Hangers and Supports for Electrical Systems.
D. Section 260533.13 - Conduit for Electrical Systems:
   1. Conduit bodies and other fittings.
   2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
F. Section 262726 - Wiring Devices:
   1. Wall plates.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. UL 508A - Industrial Control Panels; 2013.
J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS
2.01 BOXES
   A. General Requirements:
      1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
      2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
      3. Provide products listed, classified, and labeled as suitable for the purpose intended.
      4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
      5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
   B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
      1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
      2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
      3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
      4. Use raised covers suitable for the type of wall construction and device configuration where required.
      5. Use shallow boxes where required by the type of wall construction.
      6. Do not use "through-wall" boxes designed for access from both sides of wall.
      7. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
      8. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
      9. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
     11. Minimum Box Size, Unless Otherwise Indicated:
          a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.

12. Wall Plates: Comply with Section 262726.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. NEMA 250 Environment Type, Unless Otherwise Indicated:
      a. Indoor Clean, Dry Locations: Type 1, painted steel.
      b. Outdoor Locations: Type 3R, painted steel.
   3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
      a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
      b. Boxes 6 square feet (0.56 sq m) and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
   4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.

D. Underground Boxes/Enclosures:
   1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
   2. Applications:
      a. Sidewalks and Landsaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 8 load rating.
      b. Parking Lots, in Areas Subject Only To Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 15 load rating.
      c. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field measurements are as indicated.
   B. Verify that mounting surfaces are ready to receive boxes.
   C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
   A. Install products in accordance with manufacturer's instructions.
   B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
   C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
   D. Box Locations:
      1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
      2. Locate boxes as required for devices installed under other sections or by others.
      3. Locate boxes so that wall plates do not span different building finishes.
      4. Locate boxes so that wall plates do not cross masonry joints.
      5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.

7. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) horizontal separation.

8. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
   a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.

9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.

10. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
   a. Concealed above accessible suspended ceilings.
   b. Within joists in areas with no ceiling.
   c. Electrical rooms.
   d. Mechanical equipment rooms.

E. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

F. Install boxes plumb and level.

G. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
   3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.

H. Floor-Mounted Cabinets: Mount on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 033000.

I. Install boxes as required to preserve insulation integrity.

J. Underground Boxes/Enclosures:
   1. Install enclosure on gravel base, minimum 6 inches (150 mm) deep.
   2. Flush-mount enclosures located in concrete or paved areas.
   3. Mount enclosures located in landscaped areas with top at 1 inch (25 mm) above finished grade.
   4. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

K. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

L. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

M. Close unused box openings.
N. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

O. Provide grounding and bonding in accordance with Section 260526.

P. Identify boxes in accordance with Section 260553.

3.03 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION 260533.16
SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.
B. Identification nameplates and labels.
C. Wire and cable markers.
D. Voltage markers.
E. Underground warning tape.
F. Floor marking tape.
G. Warning signs and labels.

1.02 RELATED REQUIREMENTS

A. Section 099113 - Exterior Painting.
B. Section 099123 - Interior Painting.
C. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
D. Section 262726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

1.03 REFERENCE STANDARDS

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
B. Sequencing:
   1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
   2. Do not install identification products until final surface finishes and painting are complete.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
B. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
a. Switchboards:
   1) Identify ampere rating.
   2) Identify voltage and phase.
   3) Identify power source and circuit number. Include location when not within sight of equipment.
   4) Use identification nameplate to identify main overcurrent protective device.
   5) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

b. Panelboards:
   1) Identify voltage and phase.
   2) Identify power source and circuit number. Include location.
   3) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
   4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
   5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

c. Transformers:
   1) Identify kVA rating.
   2) Identify voltage and phase for primary and secondary.
   3) Identify power source and circuit number. Include location when not within sight of equipment.
   4) Identify load(s) served. Include location when not within sight of equipment.

d. Enclosed switches, circuit breakers, and motor controllers:
   1) Identify voltage and phase.
   2) Identify power source and circuit number. Include location when not within sight of equipment.
   3) Identify load(s) served. Include location when not within sight of equipment.

e. Enclosed Contactors:
   1) Identify ampere rating.
   2) Identify voltage and phase.
   3) Identify load(s) and associated circuits controlled. Include location.

2. Service Equipment:
   a. Use identification nameplate to identify each service disconnecting means.

3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.

4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.

5. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.

6. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
   a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches (76 mm) wide, painted in accordance with Section 099123 and 099113.

7. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.
   a. Service equipment.
   b. Industrial control panels.
   c. Motor control centers.
   d. Elevator control panels.
e. Industrial machinery.

8. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
   a. Minimum Size: 3.5 by 5 inches (89 mm by 127 mm).
   b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
   c. Service Equipment: Include the following information in accordance with NFPA 70.
      1) Nominal system voltage.
      2) Available fault current.
      3) Clearing time of service overcurrent protective device(s).
      4) Date label applied.

9. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.

C. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

D. Identification for Raceways:
   1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet (6.1 m).
   2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
   3. Use underground warning tape to identify underground raceways.
   4. Use voltage markers to identify highest voltage present for wireways at maximum intervals of 20 feet (6.1 m).

E. Identification for Boxes:
   1. Use voltage markers to identify highest voltage present.
   2. Use warning labels to identify electrical hazards for boxes containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".

F. Identification for Devices:
   1. Wiring Device and Wallplate Finishes: Comply with Section 262726.
   2. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
      a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
      b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
2. Legend:
   a. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
   a. Equipment Designation: 1/2 inch (13 mm).
5. Color:

D. Format for General Information and Operating Instructions:
1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch (6 mm).
5. Color: Black text on white background unless otherwise indicated.

E. Format for Caution and Warning Messages:
1. Minimum Size: 2 inches (51 mm) by 4 inches (100 mm).
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch (13 mm).
5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch (5 mm).
5. Color: Black text on clear background.

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.
D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
E. Minimum Text Height: 1/8 inch (3 mm).
F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS
A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.
B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
C. Minimum Size:
   1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
   2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
   3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).
   4. Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).
D. Legend:
   1. Markers for Voltage Identification: Highest voltage present.
E. Color: Black text on orange background unless otherwise indicated.

2.05 UNDERGROUND WARNING TAPE
A. Materials: Use foil-backed detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
B. Foil-backed Detectable Type Tape: 3 inches (76 mm) wide, with minimum thickness of 5 mil (0.1 mm), unless otherwise required for proper detection.
C. Legend: Type of service, continuously repeated over full length of tape.
D. Color:
   1. Tape for Buried Power Lines: Black text on red background.

2.06 FLOOR MARKING TAPE
A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlaminate, 3 inches (76 mm) wide, with alternating black and white stripes.

2.07 WARNING SIGNS AND LABELS
A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
B. Warning Signs:
   1. Materials:
      a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
      b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
   2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
   3. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.
C. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.
PART 3 EXECUTION

3.01 PREPARATION
A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Branch Devices: Adjacent to device.
   6. Interior Components: Legible from the point of access.
   7. Conduits: Legible from the floor.
   8. Boxes: Outside face of cover.
   9. Conductors and Cables: Legible from the point of access.
   10. Devices: Outside face of cover.
C. Install identification products centered, level, and parallel with lines of item being identified.
D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
F. Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.
G. Secure rigid signs using stainless steel screws.
H. Mark all handwritten text, where permitted, to be neat and legible.

3.03 FIELD QUALITY CONTROL
A. See Section 014000 - Quality Requirements, for additional requirements.
B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION 260553
SECTION 260583 - WIRING CONNECTIONS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
   B. Section 260533.13 - Conduit for Electrical Systems.
   C. Section 260533.16 - Boxes for Electrical Systems.
   D. Section 262726 - Wiring Devices.
   E. Section 262816.16 - Enclosed Switches.

1.02 REFERENCE STANDARDS
   A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
   B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
   C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Coordination:
      1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
      2. Determine connection locations and requirements.
   B. Sequencing:
      1. Install rough-in of electrical connections before installation of equipment is required.
      2. Make electrical connections before required start-up of equipment.

1.04 QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
      1. Colors: Conform to NEMA WD 1.
      2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
      3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
   B. Disconnect Switches: As specified in Section 262816.16 and in individual equipment sections.
   C. Wiring Devices: As specified in Section 262726.
   D. Flexible Conduit: As specified in Section 260533.13.
   E. Wire and Cable: As specified in Section 260519.
   F. Boxes: As specified in Section 260533.16.

2.02 EQUIPMENT CONNECTIONS

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that equipment is ready for electrical connection, wiring, and energization.
3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION 260583
SECTION 260919 - ENCLOSED CONTACTORS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Lighting contactors.

1.02 RELATED REQUIREMENTS
   A. Section 260529 - Hangers and Supports for Electrical Systems.

1.03 REFERENCE STANDARDS
   B. NEMA ICS 6 - Industrial Control and Systems: Enclosures; 1993 (Reaffirmed 2016).

1.04 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide dimensions, size, voltage ratings and current ratings.

1.05 QUALITY ASSURANCE
   A. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 LIGHTING CONTACTORS
   A. Description: NEMA ICS 2, magnetic lighting contactor.
   B. Configuration: Electrically held.
   C. Poles: As required to match circuit configuration and control function.
   D. Contact Rating: Match branch circuit overcurrent protection, considering derating for continuous loads.
   E. Enclosure: NEMA ICS 6, Type 1.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Install enclosed contactors where indicated, in accordance with manufacturer's instructions.
   B. Install enclosed contactors plumb. Provide supports in accordance with Section 260529.

3.02 FIELD QUALITY CONTROL
   A. See Section 014000 - Quality Requirements, for additional requirements.
   B. Inspect and test in accordance with NETA ATS, except Section 4.
   C. Perform applicable inspections and tests listed in NETA ATS, Section 7.16.1.

END OF SECTION 260919
SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Occupancy sensors.
B. Outdoor photo controls.
C. Lighting contactors.

1.02  RELATED REQUIREMENTS

A. Section 260529 - Hangers and Supports for Electrical Systems.
B. Section 260533.16 - Boxes for Electrical Systems.
C. Section 262726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, and fan speed controllers.
   1. Includes finish requirements for wall controls specified in this section.

1.03  REFERENCE STANDARDS

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
C. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.04  ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
   3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
   4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
   1. Do not install lighting control devices until final surface finishes and painting are complete.

1.05  SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

C. Field Quality Control Reports.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND PROTECTION
A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.08 FIELD CONDITIONS
A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS
A. Provide products listed, classified, and labeled as suitable for the purpose intended.
B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.02 OCCUPANCY SENSORS
A. All Occupancy Sensors:
   1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
   2. Sensor Technology:
      a. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
      b. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
   3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
   4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
   5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
   6. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
   7. Sensitivity: Field adjustable.
   8. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
9. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on the drawings.

10. Where wired sensors are indicated, wireless sensors are acceptable provided that all components and wiring modifications necessary for proper operation are included.

11. Wireless Sensors:
   a. RF Range: 30 feet (9 m) through typical construction materials.
   c. Power: Battery-operated with minimum ten-year battery life.

B. Wall Switch Occupancy Sensors:
   1. All Wall Switch Occupancy Sensors:
      a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
      b. Unless otherwise indicated or required to control the load indicated on the drawings, provide line voltage units with self-contained relay.
      c. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
      d. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
      e. Finish: Match finishes specified for wiring devices in Section 2627, unless otherwise indicated.
   2. Passive Infrared/Ultrasonic Dual Technology Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).

C. Wall Dimmer Occupancy Sensors:
   1. General Requirements:
      a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated dimming control capability, and no leakage current to load in off mode.
      b. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
      c. Manual-Off Override Control Capability: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
      d. Dimmer: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, and listed as complying with UL 1472; type and rating suitable for load controlled.
      e. Provide field adjustable dimming preset for occupied state.
      f. Finish: Match finishes specified for wiring devices in Section 2627, unless otherwise indicated.

D. Ceiling Mounted Occupancy Sensors:
   1. All Ceiling Mounted Occupancy Sensors:
      a. Description: Low profile occupancy sensors designed for ceiling installation.
      b. Unless otherwise indicated or required to control the load indicated on the drawings, provide low voltage units, for use with separate compatible accessory power packs.
      c. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
      d. Finish: White unless otherwise indicated.
   2. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:
a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

E. Power Packs for Low Voltage Occupancy Sensors:
   1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
   2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on the drawings.
   3. Input Supply Voltage: Dual rated for 120/277 V ac.
   4. Load Rating: As required to control the load indicated on the drawings.

F. Power Packs for Wireless Occupancy Sensors:
   1. Description: Plenum rated, self-contained relay compatible with specified wireless occupancy sensors for switching of line voltage loads.
   2. Input Supply Voltage: Dual rated for 120/277 V ac.
   3. Load Rating: As required to control the load indicated on the drawings.

2.03 OUTDOOR PHOTO CONTROLS

A. Stem-Mounted Outdoor Photo Controls:
   1. Description: Direct-wired photo control unit with threaded conduit mounting stem and field-adjustable swivel base, listed and labeled as complying with UL 773A.
   2. Housing: Weatherproof, impact resistant polycarbonate.
   4. Provide external sliding shield for field adjustment of light level activation.
   5. Light Level Activation: 1 to 5 footcandles (10.8 to 53.8 lux) turn-on and 3 to 1 turn-off to turn-on ratio with delayed turn-off.
   6. Voltage: As required to control the load indicated on the drawings.
   7. Failure Mode: Fails to the on position.
   8. Load Rating: As required to control the load indicated on the drawings.

2.04 LIGHTING CONTACTORS

A. Description: Magnetic lighting contactors complying with NEMA ICS 2, and listed and labeled as complying with UL 60947-1 and UL 60947-4-1; noncombination type unless otherwise indicated; ratings, configurations and features as indicated on the drawings.

B. Short Circuit Current Rating:
   1. Provide contactors with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

C. Enclosures:
   2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1 or Type 12.
   3. Finish: Manufacturer's standard unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.
D. Verify that final surface finishes are complete, including painting.
E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of lighting control devices provided under this section.

1. Mounting Heights: As indicated on the drawings.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.

G. Provide required supports in accordance with Section 260529.

H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

I. Occupancy Sensor Locations:

1. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet (1.2 m) from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

J. Outdoor Photo Control Locations:

1. Where possible, locate outdoor photo controls with photo sensor facing north. If north facing photo sensor is not possible, install with photo sensor facing east, west, or down.

2. Locate outdoor photo controls so that photo sensors do not face artificial light sources, including light sources controlled by the photo control itself.

K. Install outdoor photo controls so that connections are weatherproof. Do not install photo controls with conduit stem facing up in order to prevent infiltration of water into the photo control.

L. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

M. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

N. Where indicated or required, provide cabinet or enclosure in accordance with Section 260533.16 for mounting of lighting control device system components.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each lighting control device for damage and defects.
C. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

D. Test outdoor photo controls to verify proper operation, including time delays where applicable.

E. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.05 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

D. Adjust external sliding shields on outdoor photo controls under optimum lighting conditions to achieve desired turn-on and turn-off activation as indicated or as directed by Architect.

3.06 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.07 COMMISSIONING

A. See Section 019113 - General Commissioning Requirements for commissioning requirements.

3.08 CLOSEOUT ACTIVITIES

A. See Section 017800 - Closeout Submittals, for closeout submittals.

B. See Section 017900 - Demonstration and Training, for additional requirements.
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Electrical service requirements.

1.02 RELATED REQUIREMENTS
   A. Section 260526 - Grounding and Bonding for Electrical Systems.
   B. Section 260529 - Hangers and Supports for Electrical Systems.
   C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
   D. Section 262416 - Panelboards: Service entrance equipment.

1.03 DEFINITIONS

1.04 REFERENCE STANDARDS
   B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
   C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.05 ADMINISTRATIVE REQUIREMENTS
   A. No later than two weeks following date of the Agreement, notify Utility Company of anticipated date of service.
   B. Coordination:
      1. Verify the following with Utility Company representative:
         a. Utility Company requirements, including division of responsibility.
         b. Exact location and details of utility point of connection.
         c. Utility easement requirements.
         d. Utility Company charges associated with providing service.
      2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for electrical service and associated equipment.
      3. Coordinate arrangement of service entrance equipment with the dimensions and clearance requirements of the actual equipment to be installed.
      4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
   C. Arrange for Utility Company to provide permanent electrical service. Prepare and submit documentation required by Utility Company.
   D. Utility Company charges associated with providing permanent service to be paid by Owner.
   E. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Utility Company representative.
   F. Scheduling:
      1. Arrange for inspections necessary to obtain Utility Company approval of installation.

1.06 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.

1.07 QUALITY ASSURANCE
   A. Comply with the following:
      2. NFPA 70 (National Electrical Code).
      3. The requirements of the Utility Company.
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE, AND HANDLING
   A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
   B. Store products indoors in a clean, dry space having a uniform temperature to prevent condensation (including outdoor rated products which are not weatherproof until completely and properly installed). Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
   C. Handle products carefully to avoid damage to internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 ELECTRICAL SERVICE REQUIREMENTS
   A. Provide new electrical service consisting of all required conduits, conductors, equipment, metering provisions, supports, accessories, etc. as necessary for connection between Utility Company point of supply and service entrance equipment.
   B. Electrical Service Characteristics: As indicated on drawings.
   C. Utility Company: As indicated on drawings.
   D. Division of Responsibility: As indicated on drawings.
   E. Products Furnished by Contractor: Comply with Utility Company requirements.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field measurements are as indicated.
   B. Verify that ratings and configurations of service entrance equipment are consistent with the indicated requirements.
   C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
   A. Verify and mark locations of existing underground utilities.

3.03 INSTALLATION
   A. Install products in accordance with manufacturer's instructions and Utility Company requirements.
   B. Perform work in accordance with NECA 1 (general workmanship).
   C. Arrange equipment to provide minimum clearances and required maintenance access.
   D. Provide required support and attachment components in accordance with Section 260529.
   E. Provide grounding and bonding for service entrance equipment in accordance with Section 260526.
   F. Identify service entrance equipment, including main service disconnect(s) in accordance with Section 260553.

3.04 PROTECTION
   A. Protect installed equipment from subsequent construction operations.

END OF SECTION 262100
SECTION 262413 - SWITCHBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Low-voltage (600 V and less) switchboards and associated accessories for service and distribution applications.
   B. Overcurrent protective devices for switchboards.

1.02 RELATED REQUIREMENTS
   A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
   B. Section 260526 - Grounding and Bonding for Electrical Systems.
   C. Section 260529 - Hangers and Supports for Electrical Systems.
   D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS
   A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e (Amended 2017).
   C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
   E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
   F. NEMA PB 2 - Deadfront Distribution Switchboards; 2011.
   G. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less; 2013.
   I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
   K. UL 891 - Switchboards; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordination:
      1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
      2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
      3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
      4. Coordinate with manufacturer to provide shipping splits suitable for the dimensional constraints of the installation.
      5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for switchboards, enclosures, overcurrent protective devices, and other installed components and accessories.

1.06 QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Receive, inspect, handle, and store switchboards in accordance with manufacturer's instructions, NECA 400, and NEMA PB 2.1.
   B. Store in a clean, dry space having a uniform temperature to prevent condensation (including outdoor switchboards, which are not weatherproof until completely and properly installed). Where necessary, provide temporary enclosure space heaters or temporary power for permanent factory-installed space heaters.
   C. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
   D. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.08 FIELD CONDITIONS
   A. Maintain field conditions within required service conditions during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Source Limitations: Furnish switchboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 SWITCHBOARDS
   A. Provide switchboards consisting of all required components, control power transformers, instrumentation and control wiring, accessories, etc. as necessary for a complete operating system.
   B. Provide products listed, classified, and labeled as suitable for the purpose intended.
   C. Description: Dead-front switchboard assemblies complying with NEMA PB 2, and listed and labeled as complying with UL 891; ratings, configurations and features as indicated on the drawings.
   D. Front-Connected Switchboards:
      1. Feeder Devices: Panel/group-mounted.
      2. Arrangement: Front accessible only (not rear accessible), rear aligned.
   E. Service Conditions:
      1. Provide switchboards and associated components suitable for operation at indicated ratings under the service conditions at the installed location.
   F. Short Circuit Current Rating:
      1. Provide switchboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
   G. Main Devices: Configure for top or bottom incoming feed as indicated or as required for the installation. Provide separate pull section and/or top-mounted pullbox as indicated or as required to facilitate installation of incoming feed.
   H. Bussing: Sized in accordance with UL 891 temperature rise requirements.
1. Through bus (horizontal cross bus) to be fully rated through full length of switchboard (non-tapered). Tapered bus is not permitted.
2. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
3. Provide solidly bonded equipment ground bus through full length of switchboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
5. Ground Bus Material: Aluminum.

I. Conductor Terminations: Suitable for use with the conductors to be installed.
   1. Line Conductor Terminations:
      a. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
      b. Main and Neutral Lug Type: Mechanical.
   2. Load Conductor Terminations:
      a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
      b. Lug Type: 1) Provide mechanical lugs.

J. Enclosures:
   1. Environment Type per NEMA 250: As indicated on the drawings.
   2. Finish: Manufacturer's standard unless otherwise indicated.

K. Future Provisions:
   1. Prepare designated spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
   2. Equip distribution sections with full height vertical bussing to accommodate maximum utilization of space for devices.
   3. Where designated spaces for future device provisions are not indicated, include provisions for minimum of 4 device(s) rated at 200 amperes.

L. Instrument Transformers:
   2. Select suitable ratio, burden, and accuracy as required for connected devices.

2.03 OVERCURRENT PROTECTIVE DEVICES
   A. Circuit Breakers:
      1. Interrupting Capacity:
         a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than specified minimum requirements.
         b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
      2. Molded Case Circuit Breakers:
         a. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
            1) Provide thermal magnetic circuit breakers unless otherwise indicated.
         b. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

2.04 SOURCE QUALITY CONTROL
   A. See Section 014000 - Quality Requirements, for additional requirements.
B. Factory test switchboards according to NEMA PB 2, including the following production (routine) tests on each switchboard assembly or component:
   1. Dielectric tests.
   2. Mechanical operation tests.
   3. Grounding of instrument transformer cases test.
   4. Electrical operation and control wiring tests, including polarity and sequence tests.
   5. Ground-fault sensing equipment test.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field measurements are as indicated.
B. Verify that the ratings and configurations of the switchboards and associated components are consistent with the indicated requirements.
C. Verify that mounting surfaces are ready to receive switchboards.
D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Install switchboards in accordance with NECA 1 (general workmanship), NECA 400, and NEMA PB 2.1.
C. Arrange equipment to provide required clearances and maintenance access, including accommodations for any drawout devices.
D. Where switchboard is indicated to be mounted with inaccessible side against wall, provide minimum clearance of 1/2 inch (10 mm) between switchboard and wall.
E. Provide required support and attachment components in accordance with Section 260529.
F. Install switchboards plumb and level.
G. Unless otherwise indicated, mount switchboards on properly sized 4 inch (100 mm) high concrete pad constructed in accordance with Section 033000.
H. Provide grounding and bonding in accordance with Section 260526.
I. Install all field-installed devices, components, and accessories.
J. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
K. Provide filler plates to cover unused spaces in switchboards.
L. Identify switchboards in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL
A. See Section 014000 - Quality Requirements, for additional requirements.
B. Before energizing switchboard, perform insulation resistance testing in accordance with NECA 400 and NEMA PB 2.1.
C. Inspect and test in accordance with NETA ATS, except Section 4.
D. Perform inspections and tests listed in NETA ATS, Section 7.1.
E. Molded Case and Insulated Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1. Tests listed as optional are not required.
F. Instrument Transformers: Perform inspections and tests listed in NETA ATS, Section 7.10.
G. Correct deficiencies and replace damaged or defective switchboards or associated components.
3.04 ADJUSTING
   A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
   B. Adjust alignment of switchboard covers and doors.

3.05 CLEANING
   A. Clean dirt and debris from switchboard enclosures and components according to manufacturer's instructions.
   B. Repair scratched or marred surfaces to match original factory finish.

3.06 CLOSEOUT ACTIVITIES
   A. See Section 017800 - Closeout Submittals, for closeout submittals.

3.07 PROTECTION
   A. Protect installed switchboards from subsequent construction operations.

END OF SECTION 262413
SECTION 262416 - PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Power distribution panelboards.
   B. Lighting and appliance panelboards.
   C. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS
   A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
   B. Section 260526 - Grounding and Bonding for Electrical Systems.
   C. Section 260529 - Hangers and Supports for Electrical Systems.

1.03 REFERENCE STANDARDS
   A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
   C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
   D. NEMA PB 1 - Panelboards; 2011.
   E. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
   G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
   J. UL 67 - Panelboards; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordination:
      1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
      2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
      3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
      4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
      5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.08 FIELD CONDITIONS
A. Maintain ambient temperature within the following limits during and after installation of panelboards:
   1. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS
A. Provide products listed, classified, and labeled as suitable for the purpose intended.
B. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
C. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
D. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
E. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
   2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
F. Conductor Terminations: Suitable for use with the conductors to be installed.
G. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
   2. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.
      b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
3. Lockable Doors: All locks keyed alike unless otherwise indicated.

H. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 POWER DISTRIBUTION PANELBOARDS
A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
   1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
   1. Phase and Neutral Bus Material: Aluminum.

D. Circuit Breakers:
   1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
   2. Provide thermal magnetic circuit breakers unless otherwise indicated.

E. Enclosures:
   1. Provide surface-mounted enclosures unless otherwise indicated.
   2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
   3. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 LIGHTING AND APPLIANCE PANELBOARDS
A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
   1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   2. Main and Neutral Lug Type: Mechanical.

C. Bussing:

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:
   1. Provide surface-mounted or flush-mounted enclosures as indicated.
   2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
   3. Provide clear plastic circuit directory holder mounted on inside of door.

2.05 OVERCURRENT PROTECTIVE DEVICES
A. Molded Case Circuit Breakers:
   1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
   2. Interrupting Capacity:
      a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less
than the short circuit current rating indicated.

3. Conductor Terminations:
a. Provide mechanical lugs.
b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping
element for overload protection and magnetic instantaneous tripping element for short
circuit protection.

5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

6. Provide the following circuit breaker types where indicated:
a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with
UL 943, class A for protection of personnel.
b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for
protection of equipment.

7. Do not use tandem circuit breakers.
8. Do not use handle ties in lieu of multi-pole circuit breakers.

2.06 SOURCE QUALITY CONTROL
A. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field measurements are as indicated.
B. Verify that the ratings and configurations of the panelboards and associated components are
consistent with the indicated requirements.
C. Verify that mounting surfaces are ready to receive panelboards.
D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Perform work in accordance with NECA 1 (general workmanship).
B. Install products in accordance with manufacturer's instructions.
C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
D. Arrange equipment to provide minimum clearances in accordance with manufacturer's
instructions and NFPA 70.
E. Provide required supports in accordance with Section 260529.
F. Install panelboards plumb.
G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and
rough opening completely covered.
H. Mount panelboards such that the highest position of any operating handle for circuit breakers
or switches does not exceed 79 inches (2000 mm) above the floor or working platform.
I. Mount floor-mounted power distribution panelboards on properly sized 3 inch (80 mm) high
concrete pad constructed in accordance with Section 033000.
J. Provide grounding and bonding in accordance with Section 260526.
K. Install all field-installed branch devices, components, and accessories.
L. Provide filler plates to cover unused spaces in panelboards.

3.03 FIELD QUALITY CONTROL
A. See Section 014000 - Quality Requirements, for additional requirements.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1. Tests listed as optional are not required.
D. Test GFCI circuit breakers to verify proper operation.
E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer’s recommended torque settings.
B. Adjust alignment of panelboard fronts.
C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.05 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer’s instructions.
B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 262416
SECTION 262726 - WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.
B. Wall dimmers.
C. Receptacles.
D. Wall plates.

1.02 RELATED REQUIREMENTS

A. Section 260533.16 - Boxes for Electrical Systems.
B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2017h.
B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); 2017g.
C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
L. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
   3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
   4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
   5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
   1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
1.06 QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Products: Listed, classified, and labeled as suitable for the purpose intended.
   C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND PROTECTION
   A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS
   A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
   B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
   C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
   D. Provide GFCI protection for receptacles installed within 6 feet (1.8 m) of sinks.
   E. Provide GFCI protection for receptacles serving electric drinking fountains.
   F. Unless noted otherwise, do not use combination switch/receptacle devices.

2.02 WIRING DEVICE FINISHES
   A. Provide wiring device finishes as described below unless otherwise indicated.
   B. Wiring Devices, Unless Otherwise Indicated: White with white nylon wall plate.
   C. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate.
   D. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover.

2.03 WALL SWITCHES
   A. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
      1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
   B. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.
   C. Momentary Contact Wall Switches: Industrial specification grade, 20 A, 120/277 V with toggle type three position switch actuator and momentary contacts; single pole double throw, off with switch actuator in center position.

2.04 WALL DIMMERS
   A. Wall Dimmers - General Requirements: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.
   B. Power Rating, Unless Otherwise Indicated or Required to Control the Load Indicated on the Drawings:
2.05 RECEPTACLES

A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
   2. NEMA configurations specified are according to NEMA WD 6.

B. Convenience Receptacles:
   1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

C. GFCI Receptacles:
   1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
   3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.06 WALL PLATES

A. Wall Plates: Comply with UL 514D.
   1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
   2. Size: Standard; ________.
   3. Screws: Metal with slotted heads finished to match wall plate finish.

B. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.

C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.
3.03 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
   1. Mounting Heights: As indicated on the drawings.
   2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   3. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtailed not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

J. Install wall switches with OFF position down.

K. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

L. Do not share neutral conductor on branch circuits utilizing wall dimmers.

M. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

N. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

O. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

P. Identify wiring devices in accordance with Section 260553.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each wiring device for damage and defects.

C. Operate each wall switch and wall dimmer with circuit energized to verify proper operation.

D. Test each receptacle to verify operation and proper polarity.

E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.05 ADJUSTING

A. Adjust devices and wall plates to be flush and level.
3.06 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION 262726
SECTION 262813 - FUSES

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Fuses.
B. Spare fuse cabinet.

1.02 RELATED REQUIREMENTS
A. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS
A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.
B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
   2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.
   1. Spare Fuse Cabinet: Include dimensions.
C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Fuses: One set(s) of three for each type and size installed.
   3. Fuse Pullers: One set(s) compatible with each type and size installed.
   4. Spare Fuse Cabinet Keys: Two.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS
2.01 APPLICATIONS
A. Service Entrance:
   1. Fusible Switches Larger Than 600 Amperes: Class L, time-delay.
B. Individual Motor Branch Circuits: Class RK1, time-delay.
2.02 FUSES
A. Provide products listed, classified, and labeled as suitable for the purpose intended.
B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
C. Provide fuses of the same type, rating, and manufacturer within the same switch.
D. Comply with UL 248-1.
E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
F. Voltage Rating: Suitable for circuit voltage.
G. Class R Fuses: Comply with UL 248-12.
H. Class L Fuses: Comply with UL 248-10.

2.03 SPARE FUSE CABINET
A. Description: Wall-mounted sheet metal cabinet with shelves and hinged door with cylinder lock, suitably sized to store spare fuses and fuse pullers specified.
B. Finish: Manufacturer's standard, factory applied grey finish unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
B. Verify that mounting surfaces are ready to receive spare fuse cabinet.
C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Do not install fuses until circuits are ready to be energized.
B. Install fuses with label oriented such that manufacturer, type, and size are easily read.
C. Install spare fuse cabinet where indicated.
D. Identify spare fuse cabinet in accordance with Section 260553.

END OF SECTION 262813
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Interior luminaires.
B. Emergency lighting units.
C. Exit signs.
D. Ballasts and drivers.

1.02 RELATED REQUIREMENTS
A. Section 260533.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS
C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
   2. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
   3. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS
A. See Section 013000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND PROTECTION
A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 FIELD CONDITIONS
A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY
A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Provide three year manufacturer warranty for all LED luminaires, including drivers.
C. Provide five year pro-rata warranty for batteries for emergency lighting units.
D. Provide ten year pro-rata warranty for batteries for self-powered exit signs.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES
A. Furnish products as indicated in luminaire schedule included on the drawings.
B. Substitutions: See Section 016000 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted.

2.02 LUMINAIRES
A. Provide products that comply with requirements of NFPA 70.
B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
C. Provide products listed, classified, and labeled as suitable for the purpose intended.
D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
G. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 EMERGENCY LIGHTING UNITS
A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
C. Battery:
   1. Size battery to supply all connected lamps, including emergency remote heads where indicated.

D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.04 EXIT SIGNS

A. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.
   2. Directional Arrows: As indicated or as required for the installed location.

B. Self-Powered Exit Signs:
   1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
   2. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
   3. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.05 BALLASTS AND DRIVERS

A. Ballasts/Drivers - General Requirements:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install products in accordance with manufacturer's instructions.

D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
F. Suspended Ceiling Mounted Luminaires:
   1. Do not use ceiling support system to bear weight of luminaires unless ceiling support
      system is certified as suitable to do so.
   2. Secure pendant-mounted luminaires to building structure.
   3. Secure lay-in luminaires to ceiling support channels using listed safety clips at four
      corners.
   4. See appropriate Division 9 section where suspended grid ceiling is specified for additional
      requirements.

G. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to
   center of luminaire.

H. Install accessories furnished with each luminaire.

I. Bond products and metal accessories to branch circuit equipment grounding conductor.

J. Emergency Lighting Units:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding
      normal lighting in same room or area. Bypass local switches, contactors, or other lighting
      controls.

K. Exit Signs:
   L. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL
   A. See Section 014000 - Quality Requirements, for additional requirements.
   B. Inspect each product for damage and defects.
   C. Operate each luminaire after installation and connection to verify proper operation.
   D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power
      supply units to verify proper operation upon loss of normal power supply.
   E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or
      replace excessively noisy ballasts as determined by Architect.

3.05 ADJUSTING
   A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as
      directed by Architect. Secure locking fittings in place.
   B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of
      egress path as required or as directed by Architect or authority having jurisdiction.
   C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly
      designate egress path as directed by Architect or authority having jurisdiction.

3.06 CLEANING
   A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting),
      and manufacturer’s instructions to remove dirt, fingerprints, paint, or other foreign material and
      restore finishes to match original factory finish.

3.07 PROTECTION
   A. Protect installed luminaires from subsequent construction operations.

END OF SECTION 265100
SECTION 265600 - EXTERIOR LIGHTING

PART 1  GENERAL
1.01  SECTION INCLUDES
   A. Exterior luminaires.

1.02  RELATED REQUIREMENTS
   A. Section 260533.16 - Boxes for Electrical Systems.

1.03  REFERENCE STANDARDS
   C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
   E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
   F. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.04  SUBMITTALS
   A. See Section 013000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
      1. LED Luminaires:
         a. Include estimated useful life, calculated based on IES LM-80 test data.

1.05  QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06  DELIVERY, STORAGE, AND HANDLING
   A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
   B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.07  WARRANTY
   A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
   B. Provide three year manufacturer warranty for all LED luminaires, including drivers.

PART 2  PRODUCTS
2.01  LUMINAIRE TYPES
   A. Furnish products as indicated in luminaire schedule included on the drawings.
   B. Substitutions: See Section 016000 - Product Requirements.
2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.
B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
C. Provide products listed, classified, and labeled as suitable for the purpose intended.
D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.
H. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
C. Verify that suitable support frames are installed where required.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
B. Perform work in accordance with NECA 1 (general workmanship).
C. Install products in accordance with manufacturer's instructions.
D. Install luminaires in accordance with NECA/IESNA 501.
E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
F. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
G. Install accessories furnished with each luminaire.
H. Bond products and metal accessories to branch circuit equipment grounding conductor.
I. Install lamps in each luminaire.
3.04 FIELD QUALITY CONTROL
   A. See Section 014000 - Quality Requirements, for additional requirements.
   B. Inspect each product for damage and defects.
   C. Operate each luminaire after installation and connection to verify proper operation.
   D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 CLEANING
   A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.06 PROTECTION
   A. Protect installed luminaires from subsequent construction operations.

END OF SECTION 265600