CENTRAL SQUARE REHABILITATION

105 2ND AVE NE

GLENWOOD, MINNESOTA

PROJECT MANUAL

22 NOVEMBER 2024

PREPARED BY:

STUDIO E ARCHITECTS
envision | elevate | experience

19 East Minnesota Avenue Glenwood, MN 56334
p 320.634.9939 **c** 320.808.4998 **e** showe@studioearch.com

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PROJECT TITLE AND LOCATION:

CENTRAL SQUARE
REHABILITATION
105 2ND AVE NE
GLENWOOD, MINNESOTA 56334

OWNER:

CENTRAL SQUARE, INC
105 2ND AVE NE, SUITE 111
GLENWOOD, MINNESOTA 56334
Contact: Marie Chan, Exe
Phone: 320.634.0400
marie@centralsquare.org

ARCHITECT:

STUDIO E ARCHITECTS, LLC
19 EAST MINNESOTA AVENUE
GLENWOOD, MN 56334
Contacts:
Stephanie Howe
Phone: 320.634.9939
showe@studioearch.com

Eric Norum
Phone: 320.634.9939
enorum@studioearch.com

STRUCTURAL ENGINEER:

DESIGN TREE ENGINEERING
120 17th AVE W.
ALEXANDRIA, MN 56308
Contact: Joe Nicholson
Phone: 320.762.1290
jan@dte-ls.com

MECHANICAL ENGINEER:

MARTIN MECHANICAL DESIGN
1201 25TH AVENUE NORTH
FARGO, ND 58102
Contact: Chad Hansen
Phone: 701.293.7957
chansen@martinmech.com

ELECTRICAL ENGINEER:

VAREBERG ENGINEERING
1331 32nd AVENUE SOUTH
FARGO, ND 58103
Contact: Troy Vareberg
Phone: 701.234.0926
troy@varebergltd.com

END OF SECTION 00 0010

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ARCHITECT:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.



Stephanie Howe, AIA, LEED AP

22 NOVEMBER 2024 24874
Date Registration Number

STRUCTURAL ENGINEER:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Joe Nicholson

22 NOVEMBER 2024 44104
Date Registration Number

MECHANICAL ENGINEER:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Brian M. Martin

22 NOVEMBER 2024 41118
Date License Number

ELECTRICAL ENGINEER:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Troy Vareberg

22 NOVEMBER 2024 25261

Date Registration Number

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Innovative
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ADVERTISEMENT FOR BIDS

November 26th 2025

PROJECT: Central Square Rehabilitation

BID DATE: Thursday, December 19, 2024 @ 2:00 PM

Pre-Bid Walk Through: Tuesday, December 10, 2024 @ 2:00 PM

PROJECT SCOPE: The project consists of the interior and exterior renovation of the Central Square building in Glenwood MN.

Subcontractors and suppliers are invited to send bids to Innovative Builders, Inc. for construction work on the Central Square Rehabilitation**.** All proposals shall be presented to Innovative Builders, Inc., located at 221 30th Avenue West, Alexandria, MN 56308. Bids can also be faxed to Innovative at (320) 763-8905 or email them to dalon@innovativecompaniesinc.com.

For questions on the bid, email them to Dalon Bitzan, dalon@innvativecompaniesinc.com or call 320-763-8900

- No bid bond is required.
- The project is tax exempt. The owner is taking advantage of their tax exemption status. All sales tax is to be excluded from the bid.
- Prevailing wage rates apply – Refer to section 00 73 43 Wage Rates

Work will commence *January of 2025*. Anticipated completion date *by August 2025*

Bidding Documents
Plans will be available for viewing at Innovative Builders office located at 221 30th Avenue West in Alexandria or on-line from our web site (see instructions below).

Innovative's web site plan download instructions:
Go to www.innovativecompaniesinc.com. Click on the words "plan room" in the upper right-hand portion of the page. Enter **"csr@innovative.com"** as the user name and "**In2plans**" as the password, and then click on login. Next, the window will update showing the file directory, just click on the file to enter the directory. Once in the directory, click in the box to the left of the files you wish to download, and then click on the Red download button on the right-hand side. After a short period (depending on your internet speed), another window will open asking if you want to open, save or save as (this may vary depending on your web browser type and version). Please save or save as to your local computer.

- The website will be updated as addendums become available.

No bidder may withdraw his bid within 60 days after the set bid date. The owner reserves the right to waive any informality or to reject any or all bids.

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INSTRUCTIONS TO BIDDERS

The “Instructions to Bidders” for this Project shall be AIA Document A701 – 2018 Edition, herein after referred to as Instructions to Bidders”, is hereby incorporated by reference and is considered part of the Project Manual except as amended by Section 00 0250 Supplementary Instructions to Bidders.

END OF SECTION 00 0200

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AIA® Document A701® – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

Central Square: Rehabilitation
105 2nd Ave NE
Glenwood, MN 56334
Reconfiguration of seating on main level of auditorium (including concrete floor), misc. wall patching, painting, floor replacement/refinishing, ceiling replacement. Replacement of exterior concrete stoops, stairs and walks. Toilet room upgrades. Replacement of various exterior doors and windows.
Mechanical reconfiguration of misc. ductwork to improve air distribution. Related pluming work for toilet upgrades and new toilets.
Relocation of main electrical service to underground and various lighting upgrades and related work.

THE OWNER:
(Name, legal status, address, and other information)

Central Square, Inc.
105 2nd Avenue NE, Suite 111
Glenwood, MN 56334
Telephone Number: 320-634-0400
marie@centralsquare.org

THE ARCHITECT:
(Name, legal status, address, and other information)

Studio E Architects, Limited Liability Company
19 East Minnesota Avenue
Glenwood, MN 56334
Telephone Number: 320.634.9939
showe@studioearch.com

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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.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

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8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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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 any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

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

§ 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, to which Work may be added or deleted by 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, or that does not change, 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 By submitting a Bid, the Bidder represents that:

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** 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 observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

n/a

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§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 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.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

submit via e-mail

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall 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 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 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.

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

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§ 3.3.5 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 Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

Addenda will be transmitted through Innovative Builders

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 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 Prior to submitting a Bid, each Bidder shall ascertain 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 or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms 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" or as required by the bid form.

§ 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 neither make 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 and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name 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.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

n/a

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, 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

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of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:
(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

per direction on Advertisement for Bids by Innovative Builders

§ 4.3.2 Paper copies of the Bid, the bid security, 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.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

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

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:
(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

n/a

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ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, 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 best interests.

§ 5.3.2 Unless otherwise prohibited by law, 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 lowest responsive and responsible 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 and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; 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 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, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for 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.

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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.

§ 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 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.
(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

n/a

§ 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 commence sooner 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.

§ 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 to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

by Innovative Builders

.2 Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

by Innovative Builders

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

AIA Document 201 - 2017

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013.)

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.5 Drawings

Refer to Drawing Sheet Index in Project Manual

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages
refer to Table of Contents in Project Manual			

.7 Addenda:

Number	Date	Pages

.8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

(Paragraphs Deleted)

(Paragraph Deleted)

(Table Deleted)

(Paragraph Deleted)

(Table Deleted)

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SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

ARTICLE 1.0 DEFINITIONS:
No supplement.

ARTICLE 2.0 BIDDER'S REPRESENTATIONS:
No supplement.

ARTICLE 3.0 BIDDING DOCUMENTS:

3.2 Interpretation or Correction of Bidding Documents

3.2.2 Delete the period at the end of the paragraph and continue the sentence as follows "…or make a verbal request to the Architect at the Pre-Bid Meeting."

ARTICLE 4.0 BIDDING PROCEDUCRES:

4.1 Preparation of Bids

Delete subparagraph 4.1.7 in its entirety and replace it with the following:

"4.1.7 Each Bid shall include the legal name of the Bidder and shall show whether the Bidder is a corporation, a partnership or a sole proprietor, or any other legal entity. A Bid of a corporation shall give the State of incorporation, it shall state whether or not the corporation is licensed to do business in the State of Minnesota as a foreign corporation. A Bid of a partnership shall give the names of all the partners. A Bid of a sole proprietor doing business under a trade name shall give the name of the sole proprietor and the trade name under which the individual is doing business."

Add subparagraphs 4.1.8, 4.1.9 and 4.1.10 as follows:

"**4.1.8** Bids shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the Bidder."

"**4.1.9** Bidders shall carefully examine the Bidding Documents and be familiar with the site and existing conditions. The Contractors will not be given extra payments for conditions which can be determined by examining the site and Bidding Documents."

4.4 Modification or Withdrawal of Bid

Delete subparagraph 4.4.1 in its entirety and replace with the following:

"**4.4.1** Bid may not be modified, withdrawn, or cancelled by the Bidder until thirty (30) days after the time and date for receipt of Bids."

ARTICLE 5.0 CONSIDERATION OF BIDS:

5.2 Rejection of Bids

Add subparagraph 5.2.1 as follows:

"**5.2.1** The Owner shall have the right to waive any informality or irregularity in any Bid received."

ARTICLE 6.0 POST-BID INFORMATION:
No supplement.

ARTICLE 8.0FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

No supplement

END OF SECTION 00 0250

BID FORM, WORK SCOPES, & BID FORM SUPPLEMENTS

Bid forms are attached to this section. (Proposal form from Innovative)

WORK SCOPES are bound herein

The “Bid Form Supplements” for this project shall be:

Responsible Contractor Verification of Compliance Form

A copy of these documents are bound herein.

END OF SECTION 00 0430

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Bid Date:_____

Contractor: Innovative Builders of Alexandria Inc.
Owner: Central Square Ownership
Owner Address: 105 2nd Ave NE, Glenwood, MN 56334
Project Name: Central Square Rehabilitation

Name of Bidder:_____

Address:_____

Phone:_____ **Contact Name:**_____

Fax:_____ **Contact Email:**_____

Attachments with proposal

- Responsible Contractor Affidavit - Section 00 04 30

Base Bid Individual Work Scopes: List the work scope number, description, and the base bid in both figures and words. These bids can be awarded separately as stand-alone bids or in any combination. The project is tax exempt. Fill out all applicable lines complete.

Work Scope No. and Description:_____

Base Bid Labor:_____ Dollars: $_____

Base Bid Material:_____ Dollars: $_____

Work Scope No. and Description:_____

Base Bid Labor:_____ Dollars: $_____

Base Bid Material:_____ Dollars: $_____

Work Scope No. and Description:_____

Base Bid Labor:_____ Dollars: $_____

Base Bid Material:_____ Dollars: $_____

Combined Base Bid Work Scopes:

Work Scope No. and Description:_____

Base Bid Labor:_____ Dollars: $_____

Base Bid Material:_____ Dollars: $_____

Addendum Acknowledgement:____, _____, _____, _____

Unit Price: clarify cost per unit.

_____ $_____
_____ $_____
_____ $_____

Alternates: circle add or deduct. If no cost applicable write in N/A

_____ $_____Add/Deduct
_____ $_____Add/Deduct
_____ $_____Add/Deduct

Acknowledgement of Bidder:

In the case of the bidders base bid being accepted, the bidder agrees to begin work according to the schedule provided with the specification.

The bidder undersigned declares that the proposal submitted to the contractor is complete per the work scope described.

Undersigned is an officer of the company.

The bidder agrees to hold pricing of base bid for up 60 days post bid date.

Printed Name:_____

Signature:_____

Title:_____

Date:_____

Innovative
Builders · Erectors · Developers

CENTRAL SQUARE REHABILITATION

WORK SCOPE INDEX

All work scopes are to be bid labor and materials complete unless noted otherwise.
Project is tax exempt.

- WORK SCOPE 02A – Selective Demolition
- WORK SCOPE 02B – Structure Demolition, Earthwork, Exterior Improvements
- WORK SCOPE 03A – Cast in Place Concrete
- WORK SCOPE 04A – Masonry
- WORK SCOPE 05A – Metals
- WORK SCOPE 06A– General Construction
- WORK SCOPE 06B – Interior Architectural Woodwork
- WORK SCOPE 08A – Aluminum Entrances and Storefronts, Glazing
- WORK SCOPE 09A – Terrazzo Restoration
- WORK SCOPE 09B – Plaster Restoration Gypsum Board Assemblies
- WORK SCOPE 09C – Painting
- WORK SCOPE 09D – Tile, Resilient, & Carpeting Flooring
- WORK SCOPE 09E – Acoustical Panel Ceiling
- WORK SCOPE 22 – Division 22 Plumbing
- WORK SCOPE 23 – Division 23 HVAC
- WORK SCOPE 26 – Division 26 and 28 Electrical and Fire Alarm

WORKSCOPE 02A – Selective Demolition

WORKSCOPE 02A – Selective Demolition

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
02 41 13 – Selective Demolition

This works scope is to also include, but is not limited to the following clarifications

1. Provide removal and disposal of all demo materials. WS to provide their own dumpsters.
2. Provide shelters and negative air for demolition in existing space.
3. Protect existing finishes.
4. Coordinate with mechanical and electrical demolition
5. All saw cutting and removal for new mechanical and electrical
6. Include shoring where required per the drawing.

The following work is excluded

1. Patching of floor saw cutting will be by WS 3A

WORKSCOPE 02B – Structure Demolition, Earthwork, Exterior Improvements

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
02 41 19 – Selective Structure Demolition
31 10 00 – Earthwork and Restoration
32 90 00 – Turf and Grasses

This works scope is to also include, but is not limited to the following clarifications

1. Provide all fill under interior and exterior slabs within a tenth of an inch.
2. Provide removal and disposal of all demo materials. WS to provide their own dumpsters
3. Provide locates for all utilities prior to excavation
4. 3 Control points will be provided for the project.

WORKSCOPE 03A – Cast in Place Concrete

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
03 20 00 – Concrete Reinforcing
03 30 00 – Cast in Place Concrete
07 92 00 – Joint Sealants – as applies
32 14 13 – Brick Unit Paving
32 16 00 – Exterior Concrete

This works scope is to also include, but is not limited to the following clarifications

1. Patching of trenches for structural, mechanical, and electrical.
2. Fine grading of fill under interior and exterior slabs.
3. Provide concrete washouts.
4. Layout of contractor's work will be by this work scope.
5. Install of all items embedded in concrete provided by others.
6. 3 Control points will be provided for the project.

WORKSCOPE 04A – Masonry

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
04 05 03 – Masonry Mortaring and Grouting
04 72 00 – Cast Stone Masonry
07 92 00 – Joint Sealants – as applies

This works scope is to also include, but is not limited to the following clarifications

1. Cutting and patching for new construction.
2. Install door frames in CMU openings.
3. All air barriers as required.
4. For removals provide dumpsters
5. Include toothing in around openings
6. Includes fire sealant and all other sealants for wall assemblies
7. Include lintel install

The following work is excluded

1. Core drilling will be by others

WORKSCOPE 05A – Metals

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
05 12 00 – Structural Steel Framing
05 50 00 – Metal Fabrication
05 52 16 – Metal Egress Gate

This works scope is to also include, but is not limited to the following clarifications

1. Field measuring for all steel.
2. Receive and unload materials when delivered to site.
3. Storage of materials
4. Covering of materials

WORKSCOPE 06A – General Construction

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
06 10 53 – Misc. Rough Carpentry
06 20 00 – Finish Carpentry
07 84 13 – Penetration Firestopping – as applies
07 92 00 – Joint Sealants – as applies
08 11 13 – Hollow Metal Doors and Frames
08 21 20 – Flush Wood Doors
08 30 50 – Access Doors and Frames
08 33 00 – Rolling Counter Shutters
08 71 00 – Door Hardware
09 22 16 – Gypsum Plaster Board Assemblies – Metal Stud Framing Only
09 77 00 – Special Wall Surfacing (FRP)
10 14 00 – Signage
10 21 13 – Toilet Compartments
10 28 00 – Toilet and Bath Accessories

This works scope is to also include, but is not limited to the following clarifications

1. Install of all door frames.
2. Provide all temp shelters and barricades as required by CM. It is the responsibility of this work scope to manage and maintain shelters for the duration of the project for all other work scopes.
3. Metal stud framing only

The following work is excluded

1. Aluminum door hardware, labor and material complete by WS 8A

WORKSCOPE 06B – Interior Architectural Woodwork

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
06 40 23 – Interior Architectural Woodwork
07 92 00 – Joint Sealants – as applies

This works scope is to also include, but is not limited to the following clarifications

1. Field measurements required for fabrication of materials
2. Include caulking as applies for this work scope.

WORKSCOPE 08A – Aluminum Entrances and Storefronts, Glazing

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
07 92 00 – Joint Sealants – as applies
08 41 13 – Aluminum Entrances and Storefront
08 71 00 – Door Hardware – as applies
08 88 00 - Glazing

This works scope is to also include, but is not limited to the following clarifications

1. Modification of existing doors and frames.
2. Caulking
3. Field verifications of new and existing openings

WORKSCOPE 09A – Terrazzo Restoration

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
07 92 00 – Joint Sealants – as applies
09 01 60 – Terrazzo Restoration

This works scope is to also include, but is not limited to the following clarifications

1. Include joint sealant as applies to your work scope.

WORKSCOPE 09B – Plaster Restoration, & Gypsum Board Assemblies

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
07 92 00 – Joint Sealants – as applies
09 20 99 – Plaster Restoration
09 22 16 – Gypsum Plaster Board Assemblies
09 91 00 – Painting

This works scope is to also include, but is not limited to the following clarifications

1. Patching and refinishing of all rooms and corridors being affected by renovations.
2. Level 5 finishing over plaster and gypsum per the drawings.

The following work is excluded

1. Setting of door frames by WS 6A
2. Metal stud frame by WS 6A

WORKSCOPE 09C – Painting

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
09 91 00 – Painting

This works scope is to also include, but is not limited to the following clarifications

1. Painting of all rooms and corridors per plan

WORKSCOPE 09D –Tile, Resilient, & Carpeting Flooring

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
07 92 00 – Joint Sealants – as applies
09 30 00 – Tile
09 65 00 – Resilient Flooring
09 68 13 - Carpeting

This works scope is to also include, but is not limited to the following clarifications

1. n/a

WORKSCOPE 09E – Acoustical Panel Ceiling

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
09 51 13 – Acoustical Panel Ceiling

This works scope is to also include, but is not limited to the following clarifications

1. n/a

WORKSCOPE 22 – Division 22 Plumbing

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
02 41 19 – Selective Structure Demolition – As Applies
07 84 13 – Penetration Firestopping – as applies
07 92 00 – Joint Sealants – as applies
22 05 00 – Basic Plumbing Requirements
22 05 19 – Meters and Gauges for Plumbing
22 05 53 – Identification for Plumbing Piping and Equipment
22 07 19 – Plumbing Piping Insulation
22 10 05 – Plumbing Piping
22 10 06 – Plumbing Piping Specialties
22 30 00 – Plumbing Equipment
22 40 00 – Plumbing Fixtures

This works scope is to also include, but is not limited to the following clarifications

1. Removal of all plumbing demo per the plan.
2. Disposal of all demolished plumbing materials
3. Coordinate with WS 2A for saw cutting
4. Cut and patching.
5. Coordinate location and size of housekeeping pads with WS 3A
6. Core drilling
7. Includes all fire sealant and joint sealants for penetrations.

The following work is excluded

1. Saw cut and patch
2. Housekeeping pads

WORKSCOPE 23 – Division 23 HVAC

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
02 41 19 – Selective Structure Demolition – As Applies
07 84 13 – Penetration Firestopping – as applies
07 92 00 – Joint Sealants – as applies
23 05 00 – Basic HVAC Requirements
23 05 93 – Testing, Adjusting and Balancing for HVAC
23 07 13 – Duct Insulation
23 31 00 – HVAC Ducts and Casing
23 33 00 – Air Duct Accessories
23 34 13 – Axial HVAC Fans
23 34 23 – HVAC Power Ventilators
23 37 00 – Air Outlets and Inlets
23 52 35 – Steel Water-Tube Boilers
23 82 00 – Convection Heating and Cooling Units

This works scope is to also include, but is not limited to the following clarifications

1. Removal of all HVAC demo per the plan.
2. Disposal of all demolished HVAC equipment
3. Coordinate with WS 2A for saw cutting.
4. Cut and Patching.
5. Coordinate location and size of housekeeping pads with WS 3A.
6. Core drilling
7. Includes all fire sealant and joint sealants for penetrations.

The following work is excluded

1. Saw cut and patch
2. Housekeeping pads

WORKSCOPE 26 – Division 26 Electrical

Scope of work to include the following spec sections labor and material complete

Division 00 – Bidding and Contract Requirements
Division 01 - General Requirements
02 41 19 – Selective Structure Demolition – As Applies
07 84 13 – Penetration Firestopping – as applies
07 92 00 – Joint Sealants – as applies
26 05 00 – Common Work Results for Electrical
26 05 10 – Minor Electrical Demolition
26 05 19 – Low Voltage Electrical Conductors and Cables
26 05 26 – Grounding and Bonding for Electrical Systems
26 05 29 – Hangers and Supports for Electrical Systems
26 05 33 – Raceways and Boxes for Electrical Systems
26 05 53 – Identifications for Electrical Systems
26 09 23 – Lighting Control Devices
26 24 16 – Panel Boards
26 27 26 – Wiring Devices
26 51 19 – LED Lighting

This works scope is to also include, but is not limited to the following clarifications

1. Removal of all electrical demo per the plan.
2. Disposal of all demolished electrical equipment
3. Coordinate with WS 2A for saw cutting
4. Cut and Patch
5. Coordinate location and size of housekeeping pads with WS 3A
6. Core drilling
7. Includes all fire sealant and joint sealants for penetrations.

The following work is excluded

1. Saw cut and patch
2. Housekeeping pads

RESPONSIBLE CONTRACTOR VERIFICATION OF COMPLIANCE FORM

Minnesota Statutes, Section 16C.285, subdivision 3. **Responsible Contractor, Minimum Criteria**. "Responsible Contractor" means a contractor that conforms to the responsibility requirements in the solicitation document for its portion of the work on the project and verifies that it meets the minimum criteria set forth below. Each contractor or subcontractor shall obtain from all subcontractors with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each subcontractor.

1. The Contractor:

    i. is in compliance with workers' compensation and unemployment insurance requirements;
    ii. is in compliance with the Department of Revenue and the Department of Employment and Economic Development registration requirements if it has employees;
    iii. has a valid federal tax identification number or a valid Social Security number if an individual; and
    iv. has filed a certificate of authority to transact business in Minnesota with the secretary of state if a foreign corporation or cooperative.

2. The contractor or related entity is in compliance with and, during the three-year period before submitting verification, has not violated section 177.24, 177.25, 177.41 to 177.44, 181.13, 181.14, or 181.722, and has not violated United States Code, title 29, sections 201 to 219, or United States Code, title 40, section 3141 to 3148. For purposes of this clause, a violation occurs when a contractor or related entity:

    i. repeatedly fails to pay statutorily required wages or penalties on one or more separate projects for a total underpayment of $25,000 or more within the three-year period, provided that a failure to pay is "repeated" only if it involves two or more separate and distinct occurrences of underpayment during the three-year period;
    ii. has been issued an order to comply by the commissioner of labor and industry that has become final;
    iii. has been issued at least two determination letters within the three-year period by the Department of Transportation finding an underpayment by the contractor or related entity to its own employees;
    iv. has been found by the commissioner of labor and industry to have repeatedly or willfully violated any of the sections referenced in this clause pursuant to section 177.27;
    v. has been issued a ruling or findings of underpayment by the administrator of the Wage and Hour Division of the United States Department of Labor that have become final or have been upheld by an administrative law judge or the Administrative Review Board; or
    vi. has been found liable for underpayment of wages or penalties or misrepresenting a construction worker as an independent contractor in an action brought in a court having jurisdiction.

    Provided that, if the contractor or related entity contests a determination of underpayment by the Department of Transportation in a contested case proceeding, a violation does not occur until the contested case proceeding has concluded with a determination that the contractor or related entity underpaid wages or penalties;*

3. The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 181.723 or chapter 326B. For purposes of this clause, a violation occurs when a contractor or related entity has been issued a final administrative or licensing order;*

4. The contractor or related entity has not, more than twice during the three-year period before submitting the verification, had a certificate of compliance under section 363A.36 revoked or suspended based on the provisions of section 363A.36, with the revocation or suspension becoming final because it was upheld by the Office of Administrative Hearings or was not appealed to the office;*

5. The contractor or related entity has not received a final determination assessing a monetary sanction from the Department of Administration or Transportation for failure to meet targeted group business, disadvantaged business enterprise, or veteran-owned business goals, due to a lack of good faith effort, more than once during the three-year period before submitting the verification; and*

6. The contractor or related entity is not currently suspended or debarred by the federal government or the state of Minnesota or any of its departments, commissions, agencies, or political subdivisions that have authority to debar a contractor.

*Any violations, suspensions, revocations, or sanctions, as defined in clauses 2 to 5 occurring prior to July 1, 2014, shall not be considered in determining whether a contractor or related entity meets the minimum criteria.

Certification

By signing this document, I am certifying that I am an owner or officer of the contractor and am verifying under oath that:

1. **Contractor is in compliance with Minnesota Statutes, Section 16C.285,**
2. **I have included Attachment A-1, and**
3. **if contractor is awarded a contract, I or another owner or officer will also submit Attachment A-1 prior to execution of the contract (applicable to prime contractors only) and will update document if subcontractors are subsequently added to the project.**

Contractor Company Name	Date
Authorized Signature of Owner or Officer	Printed Name
Title	

ATTACHMENT A-1: FIRST-TIER SUBCONTRACTOR LIST
(Initial List)

SUBMIT WITH CONTRACTOR SOLICITATION RESPONSE

Minnesota Statutes, Section 16C.285, subdivision 5. A prime contractor or subcontractor shall include in its verification of compliance . . . a list of all of its first-tier subcontractors that it intends to retain for work on the project.

NAMES OF FIRST TIER SUBCONTRACTORS (Legal name of company as registered with the Secretary of State)	**Company Address**	**Work To Be Performed**

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STANDARD FORM OF AGREEMENT BETWEEN CONSTRUCTION MANAGER AND SUBCONTRACTOR for this project is by Innovative Builders. (AIA A401)

END OF SECTION 00 0500

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PERFORMANCE AND PAYMENT BONDS

Bonding is required of this project; Project bond will be provided by the Construction Manager.

END OF SECTION 00 0600

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

STANDARD information for construction of this project is American Institute of Architects Document, AIA A201, 2017 Edition, except as amended by Section 00 8000 Supplementary Conditions. A copy of this document is bound herein.

END OF SECTION 00 0700

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AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

Central Square: Rehabilitation
105 2nd Ave NE
Glenwood, MN 56334

THE OWNER:
(Name, legal status and address)

Central Square, Inc.
105 2nd Ave NE, Suite 111
Glenwood, MN 56334

THE ARCHITECT:
(Name, legal status and address)

Studio E Architects, Limited Liability Company
19 East Minnesota Avenue
Glenwood, MN 56334

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

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9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

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.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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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 or proposal 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 a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's 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 the Owner and by Separate Contractors.

§ 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. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 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

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consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 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 retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and 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 the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, 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 suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

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§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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 Section 4.2.1, the Architect does 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 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 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,

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assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 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.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 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.

§ 2.3.5 The Owner shall furnish information or services required 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.

§ 2.3.6 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.

§ 2.4 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.

§ 2.5 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 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 default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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 Contractor shall perform the Work in accordance with the Contract Documents.

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

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§ 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 2.3.4, 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 Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the 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 Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the 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 submit 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, subject to Section 15.1.7, 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be 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 notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative 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 or entities 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 Work 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.

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§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect 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

§ 3.5.1 The Contractor warrants to the Owner 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 to 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 Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work 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 Contractor shall secure and pay for the building permit as well as 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 and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect 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 that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect 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 and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

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§ 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 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 notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice 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 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 and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the

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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 perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect 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 how 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 is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is 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 Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner 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 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 the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect 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.

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§ 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 Architect on previous submittals. In the absence of such 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.

§ 3.12.10.1 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 be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately 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 and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and 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.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

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

§ 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, or patching shall be restored to the condition existing prior to the cutting, fitting, or 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 or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its 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 and 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 may do so and the Owner shall be entitled to reimbursement from the Contractor.

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§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with 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 and Architect harmless from loss on account thereof, but shall not be responsible for 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 or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, 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 3.18.1 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

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The 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. The Architect will not have control over, charge of, or responsibility for the 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.

§ 4.2.3 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 promptly report to the Owner (1) known deviations from the

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Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 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. Review of such submittals 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 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 Architect's review shall not constitute approval of safety precautions or 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.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 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 Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

§ 4.2.12 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

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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 rendered in good faith.

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests 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 a Separate Contractor or the subcontractors of a Separate Contractor.

§ 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, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice 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 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 or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner 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, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, 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 the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner 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,

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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; 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 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 SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has 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 and Separate 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 or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work,

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promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor 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 a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor 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, Separate 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 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, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner 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. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect 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 Architect and signed by the Owner 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:

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.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 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine 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 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
.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, directly related to the change; and
.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the 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.

§ 7.3.7 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.

§ 7.3.8 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 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 Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's 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 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 Architect will 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 may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will

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affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

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, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 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 (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended 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

§ 9.1.1 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.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and

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unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect 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. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and 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 Architect, but not yet included in Change Orders.

§ 9.3.1.2 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 supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 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, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations 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 Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and 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.

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§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from 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 suppliers 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 either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier 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 Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a 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 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 Architect 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 Architect and Owner 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 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 and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

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

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§ 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 or provided by 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, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after 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 Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner 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 shutdown, 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 that 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 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 Contractor's list, the Architect 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 Contractor's list, which is not sufficiently complete in accordance with 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 to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and 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 the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the 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.

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§ 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 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 shall 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.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, 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 receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with 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 Architect's final 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 (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, (3) a written statement that the Contractor knows of no 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, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and 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, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance 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 the lien, claim, security interest, or encumbrance, 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 Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, 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 the 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 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.

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§ 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;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a 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.

§ 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, a Subcontractor, or a Sub-subcontractor; and
- **.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.

§ 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 implement, 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 the owners and users of adjacent sites and utilities of the safeguards.

§ 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 and 10.2.1.3 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 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's 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 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.

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§ 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, notice of the 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 and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. 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 notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the 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 and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume 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 by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, 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 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 hazardous 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 hazardous 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 reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances 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 reimburse 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.

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ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 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.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

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§ 11.3 Waivers of Subrogation

§ 11.3.1 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, 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 those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at 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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement 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 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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 Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination 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 that the Architect has not specifically requested to examine prior to its being covered, the 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, the Contractor shall be entitled to an equitable adjustment to

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the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before 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 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 any 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 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 2.5.

§ 12.2.2.2 The one-year period for correction of Work 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.

§ 12.2.2.3 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 of the Owner or Separate Contractors, whether completed or partially completed, 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, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

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§ 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 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 the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

§ 13.3.2 No action or failure to act by the Owner, 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 upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 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 Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the 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 Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 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 Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 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 Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties 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.

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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, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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 Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, 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 reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, 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' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work 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' notice to the Owner and the 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 or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.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 reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner 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' 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 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,

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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 be certified by the Initial Decision Maker, upon application, 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 Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under 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 the 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 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 Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

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, a change in the Contract Time, 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. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the 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 Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall 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.

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§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 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 proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 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.

§ 15.1.6.2 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.

§ 15.1.7 Waiver of 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 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, 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. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a 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

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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 Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 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 the 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, if the Architect 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 receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, 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 15.1.7, 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 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

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§ 15.3.4 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. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. 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.

§ 15.4.1.1 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party 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 those of the Owner and Contractor under this Agreement.

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SUPPLEMENTARY CONDITIONS

The following supplements modify AIA Document A201 "General Conditions of the Contract for Construction", 2017 Edition. 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 1; GENERAL PROVISIONS:

1.1 Basic Definitions

Add the following Subparagraph 1.1.9 to 1.1:

1.1.9 THE PROJECT SITE

The Project Site is the tract of land and/or existing structures where the Work is to occur, and is indicated in the Contract Documents.

Add the following Subparagraphs 1.2.4, 1.2.5, 1.2.6, 1.2.7.

1.2.6 The general character and scope of the Work is shown by the drawings. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all similar parts of the Work.

1.2.5 Figured dimensions shall be followed in preference to scaled measurements. Dimensions on the drawings are subject to field verification to suite adjacent elements.

1.2.6 Where specifications are abbreviated type, they indicated complete sentences in the same manner as when a note occurs in the drawings. Omissions of words such as "the Contract shall" and "as shown on the drawings" are intentional. The words "shall" or "shall be" are to be supplied by inference. The term "provide" shall mean "furnish and install in place".

1.2.7 Where a number is listed in the specifications (as for gauges, weights, temperatures, amount of time, etc.) the number shall be interpreted as that or better.

ARTICLE 2; OWNER:

No Supplement.

ARTICLE 3: CONTRACTOR:

Add the following sentence to Subparagraph 3.4.3:

All work shall be done by workers who are thoroughly experienced in their particular trades or crafts. Apprentice labor shall be used only under the supervision of a qualified journeyperson.

Delete Subparagraphs 3.4.2. and substitute the following:

3.4.2 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 01 of the Specifications).

Add the following Subparagraphs 3.4.4, 3.4.5, 3.4.6, 3.4.7:

3.4.4 By making requests for substitutions based on Subparagraph 3.4.2 above, the Contractor:

1. represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
2. represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified.
3. certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
4. will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

3.4.5 Not later than seven days from the Contract Date, the Contractor shall provide a list showing the name of the products identified in the specifications complete with address and telephone number. The Contractor shall also provide resumes of all project managers and field supervisors for each major category for work (i.e. general, mechanical, electrical). After the Contractor has submitted the product, supplier, sub-contractor information and the resumes of Project Managers and field supervisors for each major category of work the Owner and Architect will review the submittals. The Architect will reply in writing to the Contractor stating whether the Owner or the Architect has any objections or rejects any of the products, suppliers, sub-contractors or personnel.

3.4.6 The Architect will promptly reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal. If adequate date on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides further data. Failure of the Owner or the Architect to reply promptly shall constitute notice of no reasonable objection. Failure to object to a manufacturer shall not constitute a waiver of any of requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

3.4.7 Add: "Materials and/or workmanship not in compliance with the drawings and specifications or improperly installed shall be removed and replaced by the Contractor with no change in contract price".

3.7.1 Add the following:

The Contractor shall secure and pay for a building permit in accordance with the provisions of the local and State Building Code. Where an inspection and/or certificate is required by the code, to be paid for by a fee, the Contractor shall include such fees in the bid and in the Contract. International Building Code special inspections shall be paid by the Contractor.

3.7.2 Add the following, after the first sentence:

This requirement does not relieve the Contractor of the responsibility for complying with the specifications if the requirements exceed those of the governing codes and regulations.

3.9 Superintendent

3.9.3 Delete the last sentence and substitute the following:

The Contractor shall keep the same competent superintendent continually at the project site, as well as necessary assistants, throughout the construction, completion and final acceptance of the Work within the terms of the Contract Documents. If the Contractor's superintendent neglects to carry out the work in the accordance with the Contract Documents or does not demonstrate competence to carry out the work the Owner may, after seven days written notice to the

Contractor, require that the superintendent be replaced with a superintendent satisfactory to the Owner and to the Architect.

ARTICLE 15; ADMINISTRATION OF THE CONTRACT:

No Supplement.

ARTICLE 5; SUBCONTRACTORS:

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

5.2.1 In the first sentence, delete the words "as soon as practicable" and substitute "within seven days".

5.2.1 Add the following sentence:
Acceptance of a subcontractor, other persons or organizations (including those who are to furnish materials or equipment fabricated to a custom design) shall not be construed as approval of any particular process or material.

ARTICLE 6; CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS:

Add the following Subparagraphs 6.1.5 to 6.1:

6.1.5 Wherever in the Contract Documents there appears a reference to "future" work, work to be performed "by others", work "not in this Contract" or "N.I.C.", it shall mean that the described work is not to be performed by the Contractor under this Contract, unless such work is ordered as extra work by the Owner.

ARTICLE 7; CHANGES IN THE WORK:

7.1 Changes

Add the following Subparagraphs 7.1.4, 7.1.5, 7.1.6 and 7.1.7 to 7.1:

7.14 The cost or credit to the Owner resulting from a change in the work shall be determined by one or more of the following methods.

1. by unit prices stated in the Contract Documents.
2. If applicable unit prices are not contained in the Contract Documents the Architect shall before ordering the Contractor to proceed with the desired changes, request an itemized proposal covering the work involved in the change. If the proposal is acceptable, the Architect will prepare a Change Order in accordance therewith for acceptance by the Contractor.

7.1.5 If the proposal as set forth in subparagraph 7.1.5 is not acceptable and prompt agreement between the two parties cannot be reached, the Contractor shall, if authorized by the Owner, proceed on a time and materials basis with an estimated maximum cost, and shall keep an accurate current account of the cost of such work and present it in such form at such time, and substantiated by such papers as the Owner may require. To such items of cost the following allowances for combined overhead and profit shall be added for extra work performed.

1. Ten percent (10%) of the net extra cost of labor and items incidental to labor, whether furnished by the Contractor or a Subcontractor.
2. Ten percent (10%) of the net extra cost of materials delivered to the site whether furnished by the Contractor or Subcontractor.

3. Eight percent (8%) of the fair rental value of power tools, or equipment for the additional time such tools or equipment are used in connection with the change in the work, regardless of the Ownership of such items.
4. Six percent (6%) of the net extra cost (including any overhead and profit allowed by the Contractor to the Subcontractor within percentages prescribed above) to the Contractor for all subcontracted work involved in the change.

7.1.6 The cost stipulated in Subparagraph 7.1.5 shall include all direct and necessary production cost of the work itself; i.e., labor and items incidental to labor (such as public liability and workers compensation insurance, old age and unemployment insurance, social security), pro-rated charges for supervisor, materials, tools, and use of equipment. Among the items to be considered as overhead and not as a "cost" are: insurance other than mentioned above, supervision, superintendence, timekeepers, clerks, watch personnel, small tools, incidental job burdens and general office expenses. Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificate for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in cost will be the amount of the actual net decrease as confirmed by the Architect. When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of net increase, if any.

7.1.7 Add: "The Owner or Architect are not responsible to give Notice of Change Orders to Surety (if any)".

7.2 Change Orders

Add the following Subparagraphs 7.2.2 and 7.2.3 to 7.2:

7.2.2 Each Change Order issued shall contain the following:

1. A detailed description of the change. As a minimum, a detailed description must include: Material and labor costs, supervision costs, subcontract costs, permit and fees costs, overhead and profit costs and bond and insurance costs.
2. The Contractor's itemized, bone fide written proposal together with the supporting papers required.
3. A definite statement as to the resulting change in Contract price and time.
4. A definite statement that all work involved in the change shall be performed in accordance with the Contract requirements except as modified by the Change Order.

7.2.3 No extra work shall be done nor any obligation incurred for payment therefore except upon a written order fully signed by the Owner.

7.3 Construction Change Directives

7.3.7 In the first sentence, delete the words "or if no such amount is set forth in the Agreement, a reasonable amount" and substitute "an allowance for overhead and profit in accordance with Clauses 7.3.11.1 through 7.3.11.6 below".

Add the following Subparagraphs 7.3.11 to 7.3:

7.3.11 In Subparagraph 7.3.7, the allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule.

1. Ten percent (10%) of the net extra cost of labor and items incidental to labor, whether furnished by the Contractor or a Subcontractor.

2. Eight percent (8%) of the net extra cost of materials delivered to the site whether furnished by the Contractor or a Subcontractor.
3. Eight percent (8%) of the fair rental value of power tools, or equipment for the additional time such tools or equipment are used in connection with the change in the work, regardless of the Ownership of such items.
4. Six percent (6%) of the net extra cost (including any overhead and profit allowed by the Contractor to the Subcontractor within percentages prescribed above) to the Contractor for all subcontracted work involved in the change.

ARTICLE 8; TIME:

8.2 Progress and Completion

Add the following Subparagraph 8.3.4:

8.3.4 The following will not be considered justification for extension of time unless due to one of the causes stated within this Article.

1. Delay caused by subcontractors or supplier except if the supplier goes out of business and another supplier cannot be found in time to meet schedule.
2. Shortage of workers.

8.3 Delays and Extensions of Time

Add the following to Clause 8.3.1

8.3.1 Any extension of time granted by the Architect on any part of the Work shall apply only to that part of the work. If delays or time extensions result in a claim for damages or claim for additional cost, these claims cannot include any charges related to idle workers or related to idle equipment (whether owned or rented), losses of efficiency, or underutilized/unabsorbed home office overhead expenses. These same provisions will apply to all subcontractors, sub-subcontractors and material suppliers.

ARTICLE 9; PAYMENTS AND COMPLETION

9.3 Applications for Payment

9.3.1 Add: "Unless explicitly stipulated differently in the Contract Agreement, the Contractor shall receive payments monthly, based on the work completed and the evaluation in accordance with the approved breakdown".

Add the following Clause 9.3.1.3 to 9.3.1:

9.3.1.3 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments.

Add the following clauses 9.3.3.1 and 9.3.3.2 to 9.3.3:

9.3.3.1 Lien Releases and Receipted Bills, add the following: "Before receiving any payment, except the first, the Contractor shall furnish to the Architect, along with their "Request for Payment", partial (or final as the case may be) lien releases covering all materials used and subcontracts performed in connection with their contract through the date of the previous billing. In addition, the Contractor shall furnish with each request for payment, including the first, their own waiver of lien in the full amount of their request and shall include a list of subcontractors, sub-contractors, and suppliers whose lien releases will be furnished with the following month's

request. Should the Contractor fail to furnish required lien releases, the amount of their "Request for Payment" not covered by such lien releases may not be certified".

9.3.3.2 Final Waivers of Lien, add the following: "Before final payment will be made, the Contractor shall furnish final waivers of lien, or receipted bills, covering all materials used and subcontracts performed in connection with their contract, including their own final waiver of lien in the full amount of the contract".

ARTICLE 10; PROTECTION OF PERSONS AND PROPERTY:

10.2 Safety of Persons and Property

Add the following Clauses 10.2.3.1, 10.2.3.2 and 10.2.3.3 to Subparagraph 10.2.3:

10.2.1 The Contractor shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations and floors, pits, and trenches free of water.

10.2.2 The Contractor shall at all times provide protection against rain, wind, storms, frost or heat, so as to maintain all work, materials, apparatus and fixtures free from injury or damage. At the end of each day's work, all new work likely to be damaged shall be covered. During cold weather, the Contractor shall protect all work against damage. If low temperatures make it impossible to continue operations safely in spite of cold weather precautions, Contractors shall cease work and shall so notify the Architect. Open fires will not be permitted within the building enclosure.

10.2.3 During the entire construction period of the project, the Contractor shall be solely responsible for: Providing all necessary bracing, shoring and tying of all structures, decks, and framing to prevent any structural failure or any material which would result in damage to property or the injury or death of persons; taking all precautions to insure that no part of any structure of any description is loaded beyond its carrying capacity with anything at any time during the execution of this Contract; and, for the adequacy and safety of all scaffolding and hoisting equipment.

ARTICLE 11; INSURANCE AND BONDS:

No Supplement

ARTICLE 12; UNCOVERING AND CORRECTION OF THE WORK

Add the following sentence to Subparagraph 12.2.1

12.2.1 The corrective work shall conform in the aspects with the original intent of the contract documents.

ARTICLE 13; MISCELLANEOUS PROVISIONS

13.6 Interest

Add the following sentence to 13.6

Any claims made for interest shall be made directly between the parties of this contract and shall be made separate from claims for work completed.

ARTICLE 14; TERMINATION OR SUSPENSION OF THE CONTRACT

14.2 Termination by the Owner for Cause

14.2.4 Insert the following before the sentence:

Upon payment of such difference to the Owner, all excess materials, tools, equipment and appliances shall be returned to the Contractor and/or the Owner's surety, if any. Should the Contractor and/or Owner's surety, if any, fail to pay such difference due the Owner, then the Owner shall give written notice to the Contractor and/or the Owner's surety, if any, of his intension to sell, after 15 days, any materials, tools, equipment and appliances remaining at the project site, and the proceeds from this sale shall be applied to the sum due the Owner. After serving notice, such property shall be held at the risk of the Contractor and/or Owner's surety, if any, subject only to the Owner's exercising ordinary care for the protection of such property. The Owner shall establish separate accounting records relating to the execution of unfinished work and these records shall be available to the Contractor and/or Owner's surety, if any.

ARTICLE 15; GUARANTEES

15.1 Guarantees, special guarantees, and any other guarantees required by the Contract Documents shall not exclude or otherwise limit the Owner's possible remedies at law and shall not be construed as a waiver by the Owner of any other remedy.

ARTICLE 16; ASSIGNMENT OF ANTITRUST CLAIMS

16.1 Contractor hereby assigns to the Owner any and all claims for over-charge as to goods and materials purchased in connection with this order or Contract resulting from antitrust violations which arise under the antitrust laws of the Untied States, and the antitrust laws of the State of Minnesota. In addition, Contractor warrants and represents that each of his first tier suppliers and subcontractors shall assign any and all such claims to the Owner.

ARTICLE 17; EMPLOYMENT PRACTICES

17.1 Each Contractor agrees that during the life of the contract, the Contractor will not discriminate within the State of Minnesota against any employee or applicant for employment because of race, color, creed, national origin, ancestry, sex, disability, age, sexual preference or religion and will include a similar provision in all subcontracts entered into for the performance thereof. The contract may be canceled or terminated by the Owner, and all money due or to become due under the contract may be forfeited for a second or subsequent violation of the terms or conditions of this paragraph. This paragraph is inserted in these specifications to comply with the provisions of Section 181.59 of the 1945 Minnesota Statutes Annotated.

END OF SECTION 00 0800

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INSURANCE

Refer to attached Exhibit “B” Insurance Rider.

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EXHIBIT B

INNOVATIVE BUILDERS OF ALEXANDRIA, INC., GENERAL CONTRACTOR

INSURANCE REQUIREMENTS

Subcontract Dated: TBD

Project: Central Square Rehabilitation

Subcontractor shall obtain, maintain, and pay for the insurance required by the General Contract, but in no event less than the types and limits set forth below:

TYPE OF INSURANCE	**LIMITS**	
General Liability		
Commercial General Liability on an occurrence basis with per-project aggregate limits	General Aggregate	$2,000,000
	Products- Comp./Op. Agg.	$2,000,000
	Personal & Adv. Injury	$1,000,000
	Each Occurrence	$1,000,000
	Fire Damage (any one fire)	$ 100,000
	Medical Expense (any one person)	$ 5,000
	Damage to Rented Premises	$ 100,000
Automobile		
Any Auto; Hired Autos; non-owned autos	Combined Single Limits	$1,000,000
Excess Liability		
Umbrella Form	Each Occurrence	$3,000,000
	Aggregate	$3,000,000
Worker's Compensation and Employer's Liability	Statutory Limits in State of Work $500,000 Each Occurrence	

Upon execution of this agreement, prior to the Subcontractor's commencing any work or services with regard to the project, the Subcontractor shall carry commercial general liability insurance on ISO form CG 00 01 10 01 (or substitute form providing equivalent coverage) and the Subcontractor shall provide the Contractor with a Certificate of Insurance and Additional Insured Endorsement on ISO forms CG 20 10 11 85 (or substitute forms providing equivalent coverage) or on the combination of ISO forms CG 20 10 10 01 and CG 20 37 10 01 (or substitute forms providing equivalent coverage) naming the Contractor and the Owner as Additional Insureds thereunder. Additional insured coverage shall apply as primary insurance with respect to any other insurance afforded to Owner and Contractor. Such insurance shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract). There shall be no endorsement or modification of the Commercial General Liability form arising from pollution, explosion, collapse, underground property damage or work performed by subcontractors. All coverage shall be placed with an insurance company duly admitted in the State of Minnesota and shall be reasonably acceptable to Contractor. All Subcontractor insurance carriers must maintain an A.M. Best rating of "A-" or better. Coverage shall be afforded to the Additional Insureds whether or not a claim is in litigation.

The insurance coverage required under the above paragraph shall be of sufficient type, scope, and duration to ensure coverage for the Contractor or Owner for liability related to any manifestation date within the applicable statutes of limitation and/or repose which pertain to any work performed by or on behalf of the Contractor or Owner in relation to the Project. Subcontractor agrees to maintain the above insurance for the benefit of Contractor and Owner for a period of ten years, or the expiration of the Statute of Limitations, whichever is later.

Not less than two weeks prior to the expiration, cancellation or termination of any such policy, the Subcontractor shall supply the Contractor with a new and replacement Certificate of Insurance and Additional Insured endorsement as proof of renewal of said original policy. Said new and replacement endorsements shall be similarly endorsed in favor of Contractor and Owner as set forth above.

Waiver of Subrogation: Subcontractor shall obtain from each of its insurers a waiver of subrogation on Commercial General Liability in favor of Contractor and Owner with respect to Losses arising out of or in connection with the Work.

The policies obtained and maintained to provide the specified insurance must provide that the required coverage and limits cannot be materially changed or canceled without at least 30 days prior written notice to CONTRACTOR.

Before beginning any work under this subcontract, SUBCONTRACTOR will provide to CONTRACTOR insurance certificate showing compliance with these insurance specifications.

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EXISTING HAZARDOUS MATERIAL INFORMATION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. At Central Square, an Asbestos Report dated September, 2024 was completed by Environmental Property Audits. A previous report was prepared by Larson Construction dated April, 15, 2017.

1. Copies of the asbestos material survey reports are attached following this section.
2. Neither the reports individually, nor the combination of the 2 reports, should be considered to provide a complete survey of the existing building.

1.2 REGULATORY REQUIREMENTS

A. Asbestos flooring in Existing Community Room #102 and Existing Women's Toilet #143A will be abated by others under separate contract prior to work under this contract. Work disrupting brown ceiling adhesive in the Gym and Auditorium will need to be coordinated with abatement work (by others) as required to perform work related to this project. No other existing asbestos containing material is expected to be disturbed. If any areas of existing ACM are anticipated to be disturbed due to work under this contract, contractor to notify the owner so abatement can be coordinated.

1.3 TREATMENT OF HAZARDOUS MATERIALS

A. Asbestos at Central Square – The current scope of work disturbs some of the ACM as identified in the aforementioned Asbestos Reports. Asbestos in affected areas of construction will be removed by others under separate contract. The Asbestos Reports should be reviewed by all contractors working on the site. The Architect and Owner shall not be responsible for any missed information. Should disruption of the identified materials or should additional possible ACM containing materials be uncovered during the renovation, stop work and contact the CM immediately to determine if further testing or abatement will be required. (CM to notify the owner and architect)

PART 2 – PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION 00 3126

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SURVEY FOR ASBESTOS MATERIALS FOR RENOVATION

CENTRAL SQUARE
105 2ND AVE NE
GLENWOOD, MN

September 2024

Prepared for:

MR. MICHAEL CRAIG
EXECUTIVE DIRECTOR
CENTRAL SQUARE
105 2ND AVE NE
GLENWOOD, MN

Prepared by:

ENVIRONMENTAL PROFESSIONALS
17275 TYLER ST NW
ANDOVER MN 55304
763 286 3494

ASBESTOS MATERIAL SURVE
CENTRAL SQUARE BUILDING
105 2ND AVE NE
GLENWOOD, MINNESOTA

1 0 INTRODUCTION

Environmental Property Audits, LLC (EPA, LLC) conducted a limited-scope visual survey and sampling inspection at the Central Square Building located at 105 2nd Ave NE, Glenwood, MN. The survey was completed on September 20, 2024. The purpose of the survey was to identify, sample and assess suspect building materials that may contain asbestos. The inspection was requested in order to facilitate an upcoming renovation of select areas in the building, and to provide an inventory of asbestos containing materials (ACM) as found in the planned renovation areas. This survey included the collection of bulk samples from suspect building materials. EMSL Analytical, Inc., Minneapolis, MN, analyzed the samples utilizing Polarized Light Microscopy (PLM) - Method EPA 600/R-93/116. The primary materials, which were sampled for this site, included: plaster, ceiling texture, ceramic wall tile, flooring materials, adhesives, window caulking

2 0 SCOPE OF WOR

A Minnesota licensed asbestos inspector from EPA, LLC conducted the site survey for the identification and assessment of accessible suspect ACM in the building and the outbuildings. The following activities have been completed by EPA, LLC.:

- A walk-through of the planned renovation spaces, with observations of accessible suspect ACM.
- Random sample collection from suspect ACM building materials with consideration to homogeneous areas and material types.
- Mapping and logging bulk samples for future reference.
- Estimated quantity of material types identified as regulated asbestos containing (greater than 1%).
- Analysis of bulk samples by polarized light microscopy, utilizing EMSL Analytical, Inc. of Minneapolis.

The laboratory analysis confirmed materials that are asbestos-containing and the summary includes the following information: **3 0** Building Descriptions; **4 0** Suspect Building Materials; **5 0** Asbestos Containing Building Materials List (including estimated quantities); **6 0** Non-asbestos Containing Materials List, **7 0** Non-suspect Materials; **8 0** Inspector Accreditation.

2 1 LIMITATIONS

EPA, LLC. made reasonable attempts to access all areas as identified within the scope of this renovation work. The following areas and/or materials were not able to be accessed or due to safety concerns or other limitations.

- Samples were collected by reference of color, surface texture, patterns, and material types per functional space or homogenous area.
- No roof samples were collected from this building.
- No samples were collected from the wood gym floor or the terrazzo flooring.
- No ceiling tile or ceiling adhesive sampling was conducted in the gymnasium. Samples were collected from similar materials in the office area.

3 0 BUILDING DESCRIPTION

The project consisted of an older two-story school building with unfinished basement storage area.

- The structure is a mix of wood framing, pre-cast concrete or brick.
- The exterior walls of the building are primarily brick.
- The interior had a mix of plaster or sheetrock walls and a mix of ceiling tiles.
- The floors were a mix of hardwood (gym), floor tile in Suite 111 kitchen and women's restroom area and terrazzo in most hallways.
- The interior walls for both levels are primarily wood framing and plaster.

4 0 SUSPECT BUILDING MATERIALS

Representative bulk samples of suspect ACM building materials were collected from the building. The identified materials that were considered suspect and subsequently sampled include:

- Ceramic wall tile
- Ceiling tiles
- Adhesive
- Plaster
- Window caulk
- Flooring materials

The ceilings were a mix of 1'x1', 15"x15", 1'x2', 2'x2' and 2'x4' ceiling tiles

Of the materials sampled, the following were found to be asbestos containing.

- 9"x9" tan w/green streaks floor tile/mastic (Suite 111 & kitchen)
- Brown ceiling adhesive (Auditorium)

Note: The 9"x9" brown floor tile in the women's restroom was previously tested as asbestos

Please refer to the following section for the analytical laboratory results, including material locations, and quantities.

5 0 ASBESTOS CONTAINING MATERIAL INVENTOR

The following sampled materials were found to have an asbestos content of greater than 1% by weight.

S	F S	M I	A C	M A
24-00306 B-01	Suite #111 & Kitchen	9" tan w/green floor tile black mastic	8% Chrysotile 2% Chrysotile	1250 SF
24-00306 B-18	Auditorium	Brown ceiling adhesive	5% Chrysotile	800 SF

Estimate of visible material amounts. Require abatement contractors to verify material amount for bidding purposes.

#B-19 not analyzed due to stop positive

The material amount in the auditorium is from the adhesive only

NOTE: There is 9"x9" brown floor tile in the women's RR 110 SF

6 0 NON -ASBESTOS CONTAINING MATERIAL INVENTOR

The following materials had laboratory results of "None Detected" (ND) for asbestos content. No special regulations pertain to these building materials.

S	F S	M I	A C
24-00306 B-02	Kitchen	4" black mopboard/adhesive	ND
24-00306 B-03	Kitchen	4" black mopboard/adhesive	ND
24-00306 B-04	Kitchen	1'x1' ceiling tile-random grooves	ND
24-00306 B-05	Office	1'x1' ceiling tile-pegboard	ND
24-00306 B-06	Office	Ceiling adhesive-brown	ND
24-00306 B-07	Office	Ceiling adhesive-brown	ND
24-00306 B-08	Main Floor	15"x15" ceiling tile splined	ND
24-00306 B-09	Main Floor S Hall	2'x2' ceiling tile-beige	ND
24-00306 B-10	Men's RR	1'x4' ceiling tile-beige	ND
24-00306 B-11	Women's RR	2'x4' ceiling tile-beige	ND
24-00306 B-12	Men's RR	4"x4" ceramic wall tile/grout/adhesive	ND
24-00306 B-13	Women's RR	4"x 4" ceramic wall tile/grout/adhesive	ND
24-00306 B-14	Men's RR	Tan adhesive wall panels on plaster	ND

 2024 EPA, LLC

Sample #	Functional Space	Material Identification	Asbestos Content
24-00306 B-15	Women's RR	Tan adhesive wall panels on plaster	ND
24-00306 B-16	Auditorium	1'x2' ceiling tile	ND
24-00306 B-17	Auditorium	1'x2' ceiling tile	ND
24-00306 B-20	NW Basement by Stairs	Plaster	ND
24-00306 B-21	W Gym Wall	Plaster	ND
24-00306 B-22	NE Receiving Stairs	Plaster	ND
24-00306 B-23	SE Ticket Closet	Plaster	ND
24-00306 B-24	Men's RR	Plaster/skim coat	ND
24-00306 B-25	South Wall Window	Gray caulk	ND
24-00306 B-26	South Entry Door	White caulk	ND

7.0 NON-SUSPECT MATERIALS

The following materials are present in this building but are not considered as suspect asbestos building materials.

Functional Space	Material Identification
Exterior walls	Brick finish and concrete
Foundation	Concrete slab, block

8.0 ASBESTOS BUILDING INSPECTOR ACCREDITATION

Please see the following pages for Minnesota Department of Health certification information.

Jim Lindahl

Inspector Jim Lindahl Exp. Date 10/31/24
Minnesota Certification Number – #AI2333

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EMSL Analytical, Inc.

3410 Winnetka Avenue North New Hope, MN 55427

Tel/Fax: (763) 449-4922 / (763) 449-4924

http://www.EMSL.com / minneapolislab@emsl.com

EMSL Order:	352408990
Customer ID:	ENVP52
Customer PO:	
Project ID:	

Attention:	Jim Lindahl	**Phone:**	(763) 323-6700
	Environmental Property Audits, Inc	**Fax:**	(763) 323-6677
	17275 Tulip St NW	**Received Date:**	09/23/2024 8:00 AM
	Andover, MN 55304	**Analysis Date:**	09/25/2024 - 09/26/2024
		Collected Date:	09/20/2024
Project:	CENTRAL SQ. BUIDLING, GLENWOOD		

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
24-00306 B-01-Floor Tile *352408990-0001*	9" Fl. Tile/Mastic Tan w/ green streaks Suite #111	Green Non-Fibrous Homogeneous		92% Non-fibrous (Other)	**8% Chrysotile**
24-00306 B-01-Mastic *352408990-0001A*	9" Fl. Tile/Mastic Tan w/ green streaks Suite #111	Black Non-Fibrous Homogeneous		98% Non-fibrous (Other)	**2% Chrysotile**
24-00306 B-02-Baseboard *352408990-0002*	4" Black Mopbd/Adhesive Kitchen	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-02-Adhesive *352408990-0002A*	4" Black Mopbd/Adhesive Kitchen	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-03-Baseboard *352408990-0003*	4" Brown Mopbd/Adhesive Women's RR	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-03-Adhesive *352408990-0003A*	4" Brown Mopbd/Adhesive Women's RR	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-04 *352408990-0004*	1'x1' Ceiling Tile Kitchen Random Grooves	Tan Fibrous Homogeneous	100% Cellulose		None Detected
24-00306 B-05 *352408990-0005*	1'x1' Ceiling Tile Office Pegboard Pattern	Tan Fibrous Homogeneous	100% Cellulose		None Detected
24-00306 B-06 *352408990-0006*	Ceiling Adhesive Office Brown	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-07 *352408990-0007*	Ceiling Adhesive Office Brown	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-08 *352408990-0008*	Main Fl. 15"x15" Ceiling Tile splined	Tan Fibrous Homogeneous	100% Cellulose		None Detected
24-00306 B-09 *352408990-0009*	2'x2' Ceiling Tile S. Hall Main Floor	Beige Fibrous Homogeneous	60% Cellulose 10% Glass	20% Perlite 10% Non-fibrous (Other)	None Detected
24-00306 B-10 *352408990-0010*	2'x4' Ceiling Tile Men's RR	Beige Fibrous Homogeneous	60% Cellulose 10% Glass	20% Perlite 10% Non-fibrous (Other)	None Detected
24-00306 B-11 *352408990-0011*	2'x4' Ceiling Tile Women's RR	Beige Fibrous Homogeneous	50% Cellulose 15% Glass	25% Perlite 10% Non-fibrous (Other)	None Detected

Initial report from: 09/26/2024 12:29:25

EMSL Analytical, Inc.
3410 Winnetka Avenue North New Hope, MN 55427
Tel/Fax: (763) 449-4922 / (763) 449-4924
http://www.EMSL.com / minneapolislab@emsl.com

EMSL Order: 352408990
Customer ID: ENVP52
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
24-00306 B-12-Ceramic Tile *352408990-0012*	4"x4" Ceramic Wall Tile White Men's RR	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-12-Grout *352408990-0012A*	4"x4" Ceramic Wall Tile White Men's RR	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-12-Adhesive *352408990-0012B*	4"x4" Ceramic Wall Tile White Men's RR	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-13-Ceramic Tile *352408990-0013*	4"x4" Ceramic Wall Tile White Women's RR	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-13-Grout *352408990-0013A*	4"x4" Ceramic Wall Tile White Women's RR	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-13-Adhesive *352408990-0013B*	4"x4" Ceramic Wall Tile White Women's RR	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-14 *352408990-0014*	Men's RR Tan Adhesive Wall Panels on Plaster	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-15 *352408990-0015*	Women's RR Tan Adhesive Wall Panels on Plaster	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-16 *352408990-0016*	1'x2' Ceiling Tile Auditorium	Tan Fibrous Homogeneous	100% Cellulose		None Detected
24-00306 B-17 *352408990-0017*	1'x2' Ceiling Tile Auditorium	Tan Fibrous Homogeneous	100% Cellulose		None Detected
24-00306 B-18 *352408990-0018*	Brown Ceiling Adhesive Auditorium	Brown Non-Fibrous Homogeneous		95% Non-fibrous (Other)	**5% Chrysotile**
24-00306 B-19 *352408990-0019*	Brown Ceiling Adhesive Auditorium				**Positive Stop (Not Analyzed)**
24-00306 B-20 *352408990-0020*	Plaster NW BSMT by Stairs	White/Various Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-21 *352408990-0021*	Plaster W. gym Wall	White/Various Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-22 *352408990-0022*	Plaster NE Receiving Stairs	White/Various Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-23 *352408990-0023*	Plaster SE Ticket Closet	White/Various Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-24-Plaster *352408990-0024*	Plaster Men's RR	White/Various Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-24-Skim Coat *352408990-0024A*	Plaster Men's RR	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 09/26/2024 12:29:25

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
24-00306 B-25 *352408990-0025*	South Wall Window Caulk Gray	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
24-00306 B-26 *352408990-0026*	South Entry Door Caulk White	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)
Andrew Capaul (33)

Rachel Travis, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 “Interim Method”) but augmented with procedures outlined in the 1993 (”final”) version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. New Hope, MN NVLAP Lab Code 200019-0; Colorado AL-24478

Initial report from: 09/26/2024 12:29:25

Certificate No: 5LM10312307IR

Expiration Date: October 31, 2024

This is to certify that

James Lindahl

has attended and successfully completed an

ASBESTOS INSPECTOR

REFRESHER TRAINING COURSE

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

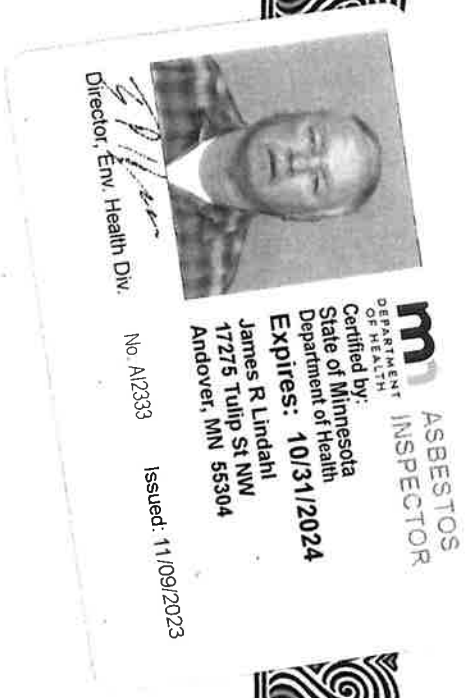
conducted by

Lake States Environmental, Ltd.

in

Hudson, WI on October 31, 2023

Examination Date: October 31, 2023



Lake States Environmental, Ltd.
P. O. Box 645, Rice Lake, WI 54868
www.lakestates.com
(800) 254-9811

Training Instructor

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ASBESTOS CHAIN OF CUSTODY

QUANTEM LABORATORIES
www.QuanTEM.com
2033 Heritage Park Drive, Oklahoma City, OK 73120-7502
(800) 822-1650 • (405) 755-7272 • Fax: (405) 755-2058

LEGAL DOCUMENT - PLEASE PRINT LEGIBLY

For Lab Use Only
Lab No. _____
Accept Reject

Contact Information			
Company: [redacted]	Larson Const.	Phone:	(320) 269[redacted] 5203
Contact: [redacted]	Dale A. Larson	Cell Phone:	[redacted]
Account #: [redacted]	B884 320-841-1467	E-mail:	[redacted]
SAMPLED BY:	Name: Dale A. Larson	Date:	4-5-2017

Project Information Remodel	
Project Name:	Central Square Build.
Project Location:	Glenwood, Mn.
Project ID:	
P.O. Number:	Contact - Fred Whittenburg

Report Results (☑ one box)	
☒	QuanTEM Website
☒	Other E-mail

RELINQUISHED BY	DATE & TIME	VIA	RECEIVED BY	DATE & TIME

REQUESTED SERVICES (Please ☑ the Appropriate Boxes)

PLM	
☐	Bulk Analysis (EPA 600/R-93/116)
☐	400 Point Count
☐	1000 Point Count
☐	Gravimetric Preparation
☐	Particle ID

PLM	
☐	Vermiculite Attic Insulation (EPA 600/R-04/004)
☐	Other

PCM	
☐	NIOSH 7400

TEM	
☐	Air- AHERA
☐	Air- NIOSH 7402
☐	Air- ISO 10312
☐	Drinking Water- EPA 100.2
☐	Waste Water- EPA 600/4-83-043

TEM	
☐	Bulk- Presence / Absence EPA600/R-93/116
☐	Bulk- Quantitative [weight%]- Chatfield
☐	Dust- Presence / Absence
☐	Dust- Quantitative [fibers/sq.cm]- ASTM D5755
☐	Other

TURNAROUND TIME	
☐	Rush
☐	Same Day
☐	24 - Hour
☐	3 - Day
☐	5 - Day

No.	Sample ID (10 Characters Max)	☑ To Be Analyzed	Color	Description	Volume / Area (as applicable)	Comments / Notes
1	G-1	☐	white	Ceiling tile 12" x12"	8'x14'	Room 205
2	G-2	☐	Brown	Glue pucks	8'x14'	120 pucks Room 205
3	G-3 T.T.P.	☐	white	Ceiling Plaster	24'x14'	Girls locker 2nd Floor
4	G-4	☐	" "	" "	" "	Ceiling
5	G-5	☐	Grey	Pipe insulation	N.A.	Buried in walls
6	G-6	☐	white	plaster	N.A.	on walls Room 206
7	G-7	☐	Grey	exterior window caulk	12 windows	1st Floor - 8'x10'
8	G-8	☐	" "	" "	12 windows	2nd Floor - 8'x10'
9	G-9	☐	Brown/Bl.	9"x9" Floor tile + mastic	11'x24'	Room 206 on concrete
10	G-10	☐	Brown/Bl	9"x9" Floor tile + mastic	24'x32'	Room 207 on Concrete

SATURDAY SAMPLE DELIVERY - CALL TO SCHEDULE • Use this address for Saturday Delivery only: 4220 N. Santa Fe Ave., Oklahoma City, OK 73105-8517 • Mark Package "Hold for Saturday Pickup"

QUANTEM LABORATORIES
www.QuanTEM.com

ASBESTOS CHAIN OF CUSTODY

2033 Heritage Park Drive, Oklahoma City, OK 73120-7502
(800) 822-1650 • (405) 755-7272 • Fax: (405) 755-2058

LEGAL DOCUMENT - PLEASE PRINT LEGIBLY

For Lab Use Only
Lab No. _____
Accept Reject

4-5-2017 Dale A. Larson

Project Information ACC # B884

Company: Larson Construction | Project Name: Central Square Building | Project Location: Glenwood, Mn.

No.	Sample ID (10 Characters Max)	☑ To Be Analyzed	Color	Description	Volume / Area (as applicable)	Comments / Notes
11	G-11 Homogenous	☐	Brown	Glue pucks	24'x32'	12' Ceilings Room 207
12	G-12 Homogenous	☐	White	12"x12" Ceiling tile pinhole	——	4 pucks per tile
13	G-13 Homogenous	☐	Black	Mastic	24'x32'	Room 208
14	G-14 Homogenous	☐	Green	9"x9" Floor tile	——	Room 107 & Girls lav.
15	G-15 Homogenous	☐	White	12"x12" Ceiling tile pinhole	24'x32'	Room 209
16	G-16 Homogenous	☐	Brown	Glue pucks	——	Room 209
17	G-17 Homogenous	☐	White	Ceiling tile	20'x16'	1st Floor Boys lav.
18	G-18 Homogenous	☐	White	Popcorn texture	16'x20'	Room 108 - office Area
19	G-19 Homogenous	☐	White	12"x12" Ceiling tile - pinhole	24'x100'	Rooms 109 & 110 & 108
20	G-20 Homogenous	☐	Brown	Glue pucks	——	
21		☐				
22		☐				
23		☐				
24		☐				
25		☐				
26		☐				
27		☐				
28		☐				
29		☐				
30		☐				

SATURDAY SERVICE DELIVERY - CALL TO SCHEDULE • Use this address for Saturday Delivery only: 324 N. Santa Fe Ave., Oklahoma City, OK 73102-3517 • Media Package Hold for Saturday Pickup

QUANTEM LABORATORIES
2033 Heritage Park Dr, Oklahoma City, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab No. 278625
Account Number: B884

Date Received: 04/10/2017
Received By: Karen Braley
Date Analyzed: 04/11/2017
Analyzed By: Carter Cox
Methodology: EPA/600/R-93/116

Client: Jerome Meidl
315 East Central St.
Springfield, MN. 56087

Project: Central Square Remodel Build
Project Location: Glenwood, MN
Project Number: N/A

QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)	Non Fibrous
001	G.1	Homogeneous	White Ceiling Tile	Asbestos Not Present	Cellulose 30 Glass Fiber 60	Paint
002	G.2	Homogeneous	Brown Mastic	Asbestos Not Present	NA	Glue
003	G.3	Layered	Tan Ceiling Texture	Asbestos Not Present	NA	Gypsum Paint
003a		Layered	White Skim Coat	Asbestos Not Present	NA	Gypsum Paint
003b		Layered	Gray Plaster	Asbestos Not Present	Cellulose 2	Sand Gypsum
004	G.4	Homogeneous	Gray Plaster	Asbestos Not Present	Cellulose 2	Sand Gypsum
005	G.5	Layered	Gray Insulation	Asbestos Not Present	Cellulose 90	Binder

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QUANTEM LABORATORIES
2033 Heritage Park Dr, Oklahoma City, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab No. 278625
Account Number: B884
Date Received: 04/10/2017
Received By: Karen Braley
Date Analyzed: 04/11/2017
Analyzed By: Carter Cox
Methodology: EPA/600/R-93/116

Client: Jerome Meidl
315 East Central St.
Springfield, MN. 56087

Project: Central Square Remodel Build
Project Location: Glenwood, MN
Project Number: N/A

QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)	Non Fibrous
005a		Layered	Dark Gray Insulation	Asbestos Present Chrysotile 20	Cellulose 50	Binder
006	G.6	Layered	White Skim Coat	Asbestos Not Present	Cellulose 3	Sand Gypsum Paint
006a		Layered	Gray Plaster	Asbestos Not Present	Cellulose 3	Sand Gypsum
007	G.7	Homogeneous	Gray Caulk	Asbestos Not Present	NA	CaCO3 Binder
008	G.8	Homogeneous	Gray Caulk	Asbestos Not Present	NA	CaCO3 Binder
009	G.9	Layered	Brown Floor Tile	Asbestos Present Chrysotile 5	NA	Vinyl

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2033 Heritage Park Dr, Oklahoma City, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab No. 278625
Account Number: B884
Date Received: 04/10/2017
Received By: Karen Braley
Date Analyzed: 04/11/2017
Analyzed By: Carter Cox
Methodology: EPA/600/R-93/116

Client: Jerome Meidl
315 East Central St.
Springfield, MN. 56087

Project: Central Square Remodel Build
Project Location: Glenwood, MN
Project Number: N/A

QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)	Non Fibrous
009a		Layered	Black Mastic	Asbestos Present Chrysotile 7	NA	Tar
010	G.10	Layered	Brown Floor Tile	Asbestos Present Chrysotile 5	NA	Vinyl
010a		Layered	Black Mastic	Asbestos Present Chrysotile 7	NA	Tar
011	G.11	Homogeneous	Brown Mastic	Asbestos Not Present	NA	Glue
012	G.12	Homogeneous	White Ceiling Tile	Asbestos Not Present	Cellulose 90	Paint
013	G.13	Homogeneous	Black Mastic	Asbestos Present Chrysotile 7	NA	Tar
014	G.14	Homogeneous	Green Floor Tile	Asbestos Present Chrysotile 8	NA	Vinyl CaCO3

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QUANTEM LABORATORIES
2033 HERITAGE PARK DR, OKLAHOMA CITY, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab No. 278625
Account Number: B884

Client: Jerome Meidl
315 East Central St.
Springfield, MN. 56087

Date Received: 04/10/2017
Received By: Karen Braley
Date Analyzed: 04/11/2017
Analyzed By: Carter Cox
Methodology: EPA/600/R-93/116

Project: Central Square Remodel Build
Project Location: Glenwood, MN
Project Number: N/A

QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)		Non Fibrous
015	G.15	Homogeneous	White Ceiling Tile	Asbestos Not Present	Cellulose	90	Paint
016	G.16	Homogeneous	Brown Mastic	Asbestos Not Present	NA		Glue
017	G.17	Homogeneous	White Ceiling Tile	Asbestos Not Present	Cellulose Glass Fiber	30 30	Perlite Paint
018	G.18	Homogeneous	White Texture	Asbestos Not Present	NA		CaCO3 Paint
019	G.19	Homogeneous	White Ceiling Tile	Asbestos Not Present	Cellulose	90	Paint
020	G.20	Homogeneous	Brown Mastic	Asbestos Not Present	NA		Glue

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QUANTEM LABORATORIES
2033 Heritage Park Dr, Oklahoma City, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab No. 278625
Account Number: B884
Date Received: 04/10/2017
Received By: Karen Braley
Date Analyzed: 04/11/2017
Analyzed By: Carter Cox
Methodology: EPA/600/R-93/116

Client: Jerome Meidl
315 East Central St.
Springfield, MN. 56087

Project: Central Square Remodel Build
Project Location: Glenwood, MN
Project Number: N/A

QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)	Non Fibrous

Carter Cox

Carter W. Cox, Analyst

4/11/2017

Date of Report

Unless otherwise noted, upon receipt the condition of the sample was acceptable for analysis.

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Minnesota Department of Health

Asbestos Contractor License

License Number: AC906 **Issued on: February 27, 2017**

To:

Larson Construction, Inc.
1407 E Sheridan Ave
Montevideo, Minnesota 56265-

Responsible Individual: Dale A. Larson

This license is valid from February 27, 2017 to February 26, 2018.

Pursuant to Minnesota Statutes, section 144.99, this license may be suspended or revoked for failure to conduct asbestos-related work in compliance with applicable regulations.

Asbestos-related work must be conducted according to Minnesota Statutes, sections 326.70 to 326.81 and Minnesota Rules, parts 4620.000 to 4620.3724.

Thomas P. Hogan, Director
Environmental Health Division

Certificate No: 5LM01031710SR *Expiration Date: January 3, 2018*

This is to certify that

Dale A. Larson

has attended and successfully completed an

ASBESTOS SUPERVISOR

REFRESHER TRAINING COURSE

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

conducted by

Lake States Environmental, Ltd.

in

White Bear Lake, MN on January 3, 2017

Examination Date: January 3, 2017

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Training Instructor

Certificate No: 5LM04271610IR

Expiration Date: April 27, 2017

This is to certify that

Dale A. Larson

has attended and successfully completed an

ASBESTOS INSPECTOR REFRESHER TRAINING COURSE

permitted by
the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722
and meets the requirements of
Section 206 of Title II of the Toxic Substances Control Act (TSCA)
conducted by

Lake States Environmental, Ltd.

in

White Bear Lake, MN on April 27, 2016
Examination Date: April 27, 2016



Director, Env. Health Div.

No. AI1415 Issued: 05/02/2016

Certified by:
State of Minnesota
Department of Health
Expires: 04/27/2017
Dale A Larson
1497 Sheridan Ave
Maplewood, MN 55265

MDH ASBESTOS INSPECTOR

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Training Instructor

WAGE RATE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Prevailing Wage

1. This contract is subject to the prevailing wages as established by the Minnesota Department of Labor and Industry as identified in the Supplementary Conditions of the Contract for Construction attached to section 00 73 00.
2. Prevailing Wage applies to this project. Current prevailing wage rates can be found at the following web address: https://www.dli.mn.gov/business/employment-practices/prevailing-wage-commercial-rates Specify Pope County, Commercial Construction (see attached).
3. The wage rates current at the time of the advertisement for bids will be the binding rates on this project.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION 00 7343

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MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE FUNDED CONSTRUCTION PROJECTS

THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Commercial

County Number: 61

County Name: POPE

Effective: 2023-12-26

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate. *Note: Overtime pay after eight (8) hours on the project must be paid even if the worker does not exceed forty (40) hours in the work week.*

Violations should be reported to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

* Indicates that adjacent county rates were used for the labor class listed.

County: POPE (61)

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
LABORERS (101 - 112) (SPECIAL CRAFTS 701 - 730)					
101*	LABORER, COMMON (GENERAL LABOR WORK)	2023-12-26	35.98	23.42	59.40
		2024-05-01	37.66	23.97	61.63
102*	LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2023-12-26	35.98	23.42	59.40
		2024-05-01	37.66	23.97	61.63
103*	LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2023-12-26	26.89	19.31	46.20
104*	FLAG PERSON	2023-12-26	35.98	23.42	59.40
		2024-05-01	37.66	23.97	61.63
105*	WATCH PERSON	2023-12-26	31.00	1.35	32.35

LABOR CODE AND CLASS			EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
106	BLASTER		FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
107*	PIPELAYER (WATER, SEWER AND GAS)		2023-12-26	32.95	21.79	54.74
			2024-05-01	35.73	22.49	58.22
108	TUNNEL MINER		FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
109*	UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)		2023-12-26	30.95	21.79	52.74
			2024-05-01	33.73	22.49	56.22
110*	SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.	+$950,000	2023-12-26	28.11	17.69	45.80
		-$950,000	2023-12-26	26.36	17.69	44.05
111	TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)		FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
SPECIAL EQUIPMENT (201 - 204)						
201*	ARTICULATED HAULER		2023-12-26	17.50	0.00	17.50
202*	BOOM TRUCK		2023-12-26	43.01	25.20	68.21
			2024-04-29	44.54	26.40	70.94
203*	LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR		2023-12-26	26.89	19.31	46.20

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
	MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS				
204*	OFF-ROAD TRUCK	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
205	PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT (ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVWAGE@STATE.MN.US			
HIGHWAY/HEAVY POWER EQUIPMENT OPERATOR					
GROUP 2 *		2023-12-26	40.00	0.00	40.00
306	GRADER OR MOTOR PATROL				
308	TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)				
GROUP 3 *		2023-12-26	32.26	25.00	57.26
309	ASPHALT BITUMINOUS STABILIZER PLANT				
310	CABLEWAY				
312	DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)				
314	DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER				
316	LOCOMOTIVE CRANE OPERATOR				
320	TANDEM SCRAPER				
322	TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)				
GROUP 4 *		2023-12-26	31.93	25.00	56.93
		2024-04-29	33.58	26.40	59.98
323	AIR TRACK ROCK DRILL				
324	AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)				
325	BACKFILLER OPERATOR				
327	BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)				
328	BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)				
329	BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
330	CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS				
331	CHIP HARVESTER AND TREE CUTTER				
332	CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE				
334	CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)				
335	CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT				
336	CURB MACHINE				
337	DIRECTIONAL BORING MACHINE				
338	DOPE MACHINE (PIPELINE)				
340	DUAL TRACTOR				
341	ELEVATING GRADER				
345	GPS REMOTE OPERATING OF EQUIPMENT				
347	HYDRAULIC TREE PLANTER				
348	LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)				
349	LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)				
350	MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER MACHINE				
352	PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE				
354	PIPELINE WRAPPING, CLEANING OR BENDING MACHINE				
356	POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES				
357	PUGMILL				
359	RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)				
360	SCRAPER				
361	SELF-PROPELLED SOIL STABILIZER				
362	SLIP FORM (POWER DRIVEN) (PAVING)				
363	TIE TAMPER AND BALLAST MACHINE				
365	TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)				
367	TUB GRINDER, MORBARK, OR SIMILAR TYPE				
GROUP 5 *		2023-12-26	31.50	0.00	31.50
370	BITUMINOUS ROLLER (UNDER EIGHT TONS)				
371	CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)				
372	FORM TRENCH DIGGER (POWER)				
375	HYDRAULIC LOG SPLITTER				
376	LOADER (BARBER GREENE OR SIMILAR TYPE)				
377	POST HOLE DRIVING MACHINE/POST HOLE AUGER				
379	POWER ACTUATED JACK				
381	SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)				
382	SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
383	SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER				
384	STUMP CHIPPER AND TREE CHIPPER				
385	TREE FARMER (MACHINE)				
GROUP 6 *		2023-12-26	29.53	25.00	54.53
		2024-04-29	31.06	26.40	57.46
387	CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER				
389	DREDGE DECK HAND				
391	GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)				
393	LEVER PERSON				
395	POWER SWEEPER				
396	SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS				
397	TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING				
COMMERCIAL POWER EQUIPMENT OPERATOR					
GROUP 1 *		2023-12-26	47.19	25.20	72.39
501	HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)				
502	TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
503	TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 2		2023-12-26	46.85	25.20	72.05
		2024-04-29	48.53	26.40	74.93
504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)				
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 3 *		2023-12-26	45.40	25.20	70.60
		2024-04-29	47.02	26.40	73.42
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)				
509	CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)				
510	DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)				
511	STATIONARY TOWER CRANE UP TO 200 FEET				
512	SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
513	TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)				
514					

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
	TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 4 *		2023-12-26	45.06	25.20	70.26
		2024-04-29	46.67	26.40	73.07
515	CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)				
516	FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
517	HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)				
518	LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)				
519	OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)				
520	TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 5 *		2023-12-26	43.01	25.20	68.21
		2024-04-29	44.54	26.40	70.94
521	AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
522	CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)				
523	CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM				
524	DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)				
525	FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)				
526	FRONT END, SKID STEER 1 C YD AND OVER				
527	HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)				
528	MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
529	POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)				
530	PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
531	SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
532	STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)				
533	TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)				
534	WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 6 *		2023-12-26	41.47	25.20	66.67
		2024-04-29	42.94	26.40	69.34
535	CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)				
536	FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
537	FRONT END, SKID STEER UP TO 1 C YD				
538	GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)				
539	TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)				
540	TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
GROUP 7		2023-12-26	40.31	25.20	65.51
		2024-04-29	41.73	26.40	68.13
541	AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)				
542	BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)				
543	CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)				
544	FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
545	OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
546	PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)				
547	PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 8 *		2023-12-26	16.10	6.00	22.10
548	ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)				
549	GREASER (COMMERCIAL CONSTRUCTION ONLY)				
550	MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED) (COMMERCIAL CONSTRUCTION ONLY)				
TRUCK DRIVERS					
GROUP 1 *		2023-12-26	30.00	6.91	36.91
601	MECHANIC . WELDER				
602	TRACTOR TRAILER DRIVER				
603	TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)				
GROUP 2 *		2023-12-26	23.10	6.91	30.01
604	FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK				
GROUP 3 *		2023-12-26	25.00	6.91	31.91
605	BITUMINOUS DISTRIBUTOR DRIVER				
606	BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)				
607	THREE AXLE UNITS				
GROUP 4 *		2023-12-26	23.00	6.76	29.76
608	BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)				
609	DUMP PERSON				
610	GREASER				
611	PILOT CAR DRIVER				
612	RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
613	TWO AXLE UNIT				
614	SLURRY OPERATOR				
615	TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616	TRACTOR OPERATOR, UNDER 50 H.P.				
SPECIAL CRAFTS					
701	HEATING AND FROST INSULATORS	2023-12-26	49.04	31.70	80.74
702*	BOILERMAKERS	2023-12-26	44.37	30.55	74.92
		2024-01-01	46.00	31.93	77.93
703*	BRICKLAYERS	2023-12-26	39.35	27.49	66.84
		2024-05-01	42.85	27.49	70.34
704	CARPENTERS	2023-12-26	31.64	26.19	57.83
		2024-04-29	34.19	26.19	60.38
705*	CARPET LAYERS (LINOLEUM)	2023-12-26	32.23	24.45	56.68
		2024-04-29	34.78	24.45	59.23
706*	CEMENT MASONS	2023-12-26	44.31	23.47	67.78
		2024-04-29	48.06	23.47	71.53
707	ELECTRICIANS	2023-12-26	43.67	27.49	71.16
708*	ELEVATOR CONSTRUCTORS	2023-12-26	57.49	43.71	101.20
		2024-01-01	59.95	44.53	104.48
709*	GLAZIERS	2023-12-26	46.73	25.50	72.23
		2024-06-03	49.73	25.50	75.23
710*	LATHERS	2023-12-26	29.21	19.57	48.78
712*	IRONWORKERS	2023-12-26	43.00	34.11	77.11
		2024-04-28	46.00	34.11	80.11
714*	MILLWRIGHT	2023-12-26	41.70	31.81	73.51
715*		2023-12-26	30.10	23.45	53.55

LABOR CODE AND CLASS		EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
	PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)				
716*	PILEDRIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2023-12-26	41.14	27.05	68.19
717	PIPEFITTERS . STEAMFITTERS	2023-12-26	47.24	32.50	79.74
		2024-05-01	50.44	32.50	82.94
718*	PLASTERERS	2023-12-26	38.96	19.45	58.41
719	PLUMBERS	2023-12-26	48.29	29.58	77.87
720*	ROOFER	2023-12-26	39.01	21.93	60.94
		2024-06-01	41.81	21.93	63.74
721	SHEET METAL WORKERS	2023-12-26	32.00	8.28	40.28
722*	SPRINKLER FITTERS	2023-12-26	41.02	26.09	67.11
		2024-04-01	41.02	26.67	67.69
723*	TERRAZZO WORKERS	2023-12-26	38.91	19.40	58.31
724*	TILE SETTERS	2023-12-26	25.00	0.00	25.00
725*	TILE FINISHERS	2023-12-26	14.00	0.00	14.00
726*	DRYWALL TAPER	2023-12-26	29.97	23.73	53.70
727*	WIRING SYSTEM TECHNICIAN	2023-12-26	44.61	20.16	64.77
728*	WIRING SYSTEMS INSTALLER	2023-12-26	31.25	16.34	47.59
729*	ASBESTOS ABATEMENT WORKER	2023-12-26	37.63	23.36	60.99
		2024-01-01	39.86	24.11	63.97
730*	SIGN ERECTOR	2023-12-26	31.07	18.75	49.82

LABOR CODE AND CLASS	EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE

SUMMARY

1.0 LOCATION OF SITE: The site is located at 105 2nd Avenue NE, Glenwood, MN 56334.

2.0 GENERAL DESCRIPTION OF THE WORK:

2.1 The following is a general description of the work required for the building construction and site work for the project, hereinafter specified and shown on the drawings.

Proposed Project consists of remodeling existing mixed use community arts building. (DOES NOT INVOLVE CHANGE OF OCCUPANCY)
Includes reconfiguration of seating on main level of Auditorium (including replacement of concrete floor to improve accessibility)
Miscellaneous wall patching, painting, floor replacement, ceiling replacement.
Upgrades/remodel to existing toilet rooms for new finishes and to improve accessibility.
Replacement of some exterior entry doors and replacement of deteriorated exterior concrete steps and sidewalks.
Replacement of misc windows.
Alternate work to add catwalk to auditorium attic.
Mechanical includes reconfiguration of misc ductwork to improve air distribution and work related to toilet remodeling. Alternate work to replace HVAC system in Community Room
Electrical includes relocation of main overhead electrical service to underground and work related to remodeling. Alternate work to replace Theater Lighting system

2.2 Unless otherwise specified, the contractor shall supply labor, transportation, materials, apparatus, fuel, energy, light, scaffolding, and tools necessary for the entire proper and final completion of their work; and shall install, maintain, and remove all equipment of the construction and other utensils or items, and be responsible for the safe, proper, and lawful construction, maintenance, and use of same; and shall construct in the best and most workmanlike manner, a complete project including everything properly incidental thereto as shown on the plans, stated in specifications or reasonably implied therefrom, all in accordance with the Contract Documents.

2.3 Work hours shall be coordinated with the owner. The existing building is to remain occupied during construction, with as minimal disruption to the occupants as possible.

2.4 Construction deliveries to be coordinated with Innovative Builders and Central Square.

3.0 CONTRACT LIMITS:

3.1 The contract limits of this project are contained within the restraints as necessary to complete the work shown, and any incidental work, which support this construction, and which are shown on the drawings.

4.0 COORDINATION WITH OCCUPANTS:

4.1 Owner Occupancy: Owner will occupy the premises during the entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits.

1. Maintain access to existing walkways, corridors and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors or other occupied or used facilities without written permission from Owner of activities that will affect Owner's operations.
2. Provide not less than 72 hours-notice to Owner of activities that will affect Owner's operations.
3. Nonsmoking Building and Site: Smoking is not permitted within the building or on property.
4. Controlled Substances: Use of tobacco products and other controlled substances on the Project Site is not permitted.

END OF SECTION 01 1100

MILESTONE SCHEDULE

INNOVATIVE BUILDERS TO PROVIDE OVERALL SCHEDULE:

END OF SECTION 01 0014

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ALTERNATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS

A. Definition: An alternate is an amount proposed by Bidders and stated on the Bid Form that will be added to or deducted from Base Bid amount if the owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installation methods described in the Contract Documents.

B. Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted alternate is complete and fully integrated into the project.

C. Notification: Immediately following award of Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates, if any.

D. Schedule: A “Schedule of Alternates” is included at the end of this section. Specification sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the work described under each alternate.

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

1.3 SCHEDULE OF ALTERNATES:

Add Alternate No. 1: New Theater Lighting system.

Add Alternate No. 2: New Catwalk in auditorium attic.

Add Alternate No. 3: Mechanical HVAC heating and cooling system replacement in Community Room 102

END OF SECTION 01 2300

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CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections: the following sections contain requirements that relate to this section:

1. Division 01 Section “Submittal Procedures” for requirements for the Contractor’s Construction Schedule.
2. Division 01 Section ”Payment Procedures” for administrative procedures governing applications for payment.
3. Division 01 Section “Product Requirements” for administrative procedures for handling requests for substitutions made after award of the Contract.

C. Requirements for the Contractor’s Construction Schedule are included in Division 01 Section “Submittal Procedures”.

1.3 MINOR CHANGES IN THE WORK

A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.

1.4 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.

1. Proposal requests issued by the Architect are for information only. Do not consider them as instruction either to stop work in progress, or to execute the proposed change.
2. Unless otherwise indicated in the proposal request, within 5 days of receipt of the proposal request, submit to the Architect for the Owner’s review an estimate of cost necessary to execute the proposed change.
    a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor-Initiated Change Order Proposal Request: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section “Product Substitutions” if the proposed change in the Work requires the substitution of one product or system for a product or system specified.

C. Proposal Request Form: Submit Change Order Proposal Requests in letter form.

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. The Construction Change Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.6 CHANGE ORDER PROCEDURES

A. Upon the Owner’s approval of a change Order Proposal Request, the Architect will issue a Change Order for signature of the Owner and the Contractor on AIA Form G701, as provided in the Conditions of the Contract.

END OF SECTION 01 2600

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
   1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, list of Subcontracts, and Submittal Schedule.

B. The Contractor's Construction Schedule and Submittal Schedule are included in Division 01 Section "Submittal Procedures".

1.3 SCHEDULE OF VALUES

A. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
   1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
      a. Contractor's construction schedule.
      b. Application for Payment form.
      c. List of subcontractors.
      d. List of products.
      e. List of principal suppliers and fabricators.
      f. Schedule of submittals.
   2. Submit the Schedule of Values to the Architect at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial Application for Payment.

B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of the Architect.
      c. Project number.
      d. Contractor's name and address.
      e. Date of Submittal.
   2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed.
      a. Generic name.
      b. Related Specification Section.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that have affected value.
      g. Dollar value.
      h. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and Progress reports. Break principal subcontract amounts down into several line items.
4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
    a. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense.
7. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a Change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
    1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
B. Payment Application Times: Each progress payment date is as indicated in the Agreement. Each period of construction Work covered by each Application or Payment is the Period indicated in the Agreement.
C. Payment Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Application for Payment.
D. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned.
    1. Entries shall match data on the Schedule of Values and Contractors Construction Schedule. Use updated schedules if revisions have been made.
    2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
E. Transmittal: Submit 1 pdf document of each Application for Payment to the Architect by e-mail; one copy shall be complete, including waivers of lien and similar attachments, when required.
    1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors or sub-subcontractors and suppliers for the construction period covered by the previous application.
    1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers.
3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
1. List of subcontractors.
2. List of principal suppliers and fabricators.
3. Contractor's Construction Schedule (preliminary if not final).
4. Schedule of principal products.
5. Schedule of unit prices.
6. Submittal Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from governing authorities for performance of the Work.
11. Initial progress report.
12. Report of pre-construction meeting.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds (if required).
15. Data needed to acquire Owner's insurance.
16. Initial settlement survey and damage report, if required.
17. Safety Policy
18. MSDS Sheets
19. Schedule of Values
20. State of Minnesota contractor license, MN Department of Labor and Industry Registration
21. Minnesota Department of Revenue Non-Minnesota Construction Contractor Exemption Certificate (if applicable).
22. W-9 Form

I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Administrative actions and submittals that shall proceed or coincide with this application include:
1. Occupancy permits and similar approvals.
2. Warranties (guarantee) and maintenance agreements.
3. Test/adjust/balance records.
4. Maintenance instructions.
5. Meter readings.
6. Start-up performance reports.
7. Change-over information related to Owner's occupancy, use, operation and maintenance.
8. Final Cleaning.
9. Application for reduction of retainage, and consent of surety.
10. Advice on shifting insurance coverage.

11. Final progress photographs.
12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

K. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final Application for Payment for retainage include the following:
1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion.
3. Assurance that unsettled claims will be settled.
4. Assurance that Work not complete and accepted will be completed without delay.
5. Transmittal of required Project construction records to Owner.
6. Certified Property survey.
7. Proof that taxes, fees and similar obligations have been paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish and similar elements.
10. Change of door locks to Owner's access.
11. IC 134 – Withholding Affidavit for Contractors
12. AIA G706 – Contractors Affidavit of Payment of Debts and Claims
13. AIA G706A – Contractors Affidavit of Release of Liens
14. AIA G707 – Consent of Surety to Final Payment
15. Contractors lien waiver in the full amount of the contract sum
16. Lien waivers from sub-contractors and material suppliers

PART 2 – PRODUCTS

(Not applicable)

PART 3 – EXECUTION

(Not applicable)

END OF SECTION 01 2900

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
   1. Coordination.
   2. Administrative and supervisory personnel.
   3. General installation provisions.
   4. Cleaning and protection.

B. Progress Meetings, coordination meetings and pre-installation conferences are included below.

C. Requirements for the Contractor's Construction Schedule are included in Division 01 Section "Submittal Procedures".

1.3 SUBMITTALS

A. Coordination Drawings: Prepare and submit coordination drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
   1. Show the interrelationship of components shown on separate Shop Drawings.
   2. Indicate required installation sequences.
   3. Comply with requirements contained in Division 01 Section "Submittal Procedures".
   4. Refer to Division -21 through Division -26 for requirements for specific coordination drawing requirements for mechanical, electrical, communications and security installations.

B. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
   1. Post copies of the list in the Project meeting room, the temporary field office, and at each temporary telephone.

PART 2 – PRODUCTS

(not applicable)

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which the Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with the manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or more stringent than requirements contained in the contract documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
E. Visual Effect: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
F. Recheck measurements and dimensions, before starting each installation.
G. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height choices to the Architect for final decision.

3.2 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
C. Limiting Exposures: Supervise construction activities to ensure that not part of the construction, completed or in progress, is subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

3.3 PRE-CONSTRUCTION CONFERENCE

A. Schedule a pre-construction conference and organizational meeting at the project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
B. Attendees: The Owner, Architect and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented by persons familiar with and authorized to conclude matters relating to the Work.
C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Tentative construction schedule.
2. Critical Work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data, and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, Work and Storage areas.
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First Aid.
14. Security.
15. Housekeeping.
16. Working hours.

3.4 PROGRESS MEETINGS

A. Conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Owner and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with correct progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude these matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance as appropriate to the current status of the Project.

D. Contractor Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.

1. Review the present and future needs of each entity present, including such items as:
   a. Interface requirements.
   b. Time.
   c. Sequences.
   d. Deliveries.
   e. Off-site fabrication problems.
   f. Access.
   g. Site Utilization.
   h. Temporary facilities and services.
   i. Hours of work.
   j. Hazards and risks.
   k. Housekeeping.
   l. Quality and Work Standards.
   m. Change Orders.
   n. Documentation of information for payment requests.

E. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: Revise construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

END OF SECTION 01 3100

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SUBMITTAL PROCEDURES

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specifications, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
   1. Contractor's construction schedule.
   2. Daily construction reports.
   3. Shop Drawings.
   4. Product Data.
   5. Samples.

B. Administration Submittals: Refer to other Division 01 Sections and other Contract documents for requirements for administrative submittals. Such submittals include, but are not limited to:
   1. Permits.
   2. Applications for payment.
   3. Performance and payment bonds.
   4. Insurance certificates.
   5. List of Subcontractors.
   6. Submittal Schedule.
   7. Construction Schedule.

C. Inspection and test reports are included in Section "Quality Requirements",

1.3 SUBMITTAL PROCEDURES

A. Prepare a **submittal schedule** listing required submittals and indicate timing where they fit within the construction schedule. Submit within 30 days of the date established for "Commencement of Work."

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay. Transmit all submittals to the Architect via e-mail. The Architect will transmit to the appropriate sub-consultant for review.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.
      a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for submittals.
   1. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will

promptly advise the Contractor when a submittal being processed must be delayed for coordination.

2. If an intermediate submittal is necessary, process the same as the initial submittal.
3. **Allow two weeks for reprocessing each submittal.**
4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

D. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
   a. Submittals not bearing the Contractor's approval stamp and signature, indicating that the submittal has been reviewed for compliance with the contract documents, will be returned to the Contractor without action by the Architect/Engineer.
2. Include the following information on the label for processing and recording action taken.
   a. Project Name.
   b. Date.
   c. Name and address of Architect.
   d. Name and address of Contractor.
   e. Name of address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Number and title of appropriate Specification Section.
   i. Drawing number and detail references, as appropriate.

E. **Submittal Transmittal (as pdf file): Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using a pdf transmittal form. Submittals received from sources other than the Contractor will be returned without action**.

1. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Documents requirements, including minor variation and limitations. **Include Contractor's certification that information complies with Contract Document requirements.**

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit within 30 days of the date established for the "Commencement of Work".

1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".

2. Within each time bear indicate estimated completion percentage in 10% increments. As work progresses, place a contrasting mark in each bar to indicate Actual Completion.
3. Prepare the schedule on a sheet, or a series of sheets, of sufficient width to show data for the entire construction period.
4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
5. Coordinate the Contractor's construction schedule wit the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

B. Distribution: Following response to the initial submittal, distribute a pdf copy to the Architect, Owner, subcontractors, and other parties required to comply with the scheduled dates. Post copies in the temporary field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

1.5 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Architect at weekly intervals.
1. List of subcontractors at the site.
2. Approximate account of personnel at the site.
3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.
5. Meetings and significant decisions.
6. Stoppages, delays, shortages, losses.
7. Meter readings and similar recordings.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Services connected, disconnected.
12. Equipment or system tests and start-ups.
13. Partial Completions, occupancies.
14. Substantial Completions authorized.

1.6 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale as a pdf file. Highlight, encircle, or otherwise indicate deviations from the Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.

C. Sheet Size: Except for templates, patterns and similar full-size Drawings, **submit Shop Drawings as pdf files to be printed at least 8-1/2" x 11" but not larger than 24" x 36".**

D. Submittal: Submit one pdf file for the Architect's review
1. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

E. Coordination Drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function is intended.
1. Preparation of coordination drawings is specified in Section "Project Management and Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
2. Submit coordination drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

1.7 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings".
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
a. Manufacturer's printed recommendations.
b. Compliance with recognized trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

B. Submittals: Submit 1 pdf copy of each required submittal. The Architect and each applicable consultant will return a pdf marked with action taken and corrections or modifications required.
1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

C. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on pdf transmittal forms.

1. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
    a. Do not permit use of unmarked copies of product data in connection with construction.

1.8 SAMPLES

A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
    1. Mount, display, or package samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's Sample. Include the following:
        a. Generic description of the Sample.
        b. Sample source.
        c. Product name or name of manufacturer.
        d. Compliance with recognized standards.
        e. Availability and delivery time.

B. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    1. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.
    2. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.

C. Preliminary Submittals: Where samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
    1. The Contractor will be notified of the Architect's selection and other actions, following review of the preliminary submittals.

D. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets: one will be returned marked with the action taken.
    1. Maintain sets of Samples, as returned, at the project site, for quality comparisons throughout the course of construction.
        a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
        b. Sample sets may be used to obtain final acceptance of the construction associated with each set.

E. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

F. Field Samples specified individual Sections are special types of Samples. Field Samples are full-size examples erected on the site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.
   1. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.9 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.
   1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows to indicate the action taken:
   1. Final Unrestricted Release: Where submittals are marked "Reviewed," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
   2. Final-But-Restricted Release: When submittals are marked "Furnish as Corrected," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
   3. Return for Resubmittal: When submittal is marked "Not Approved, Revise and Resubmit", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
      a. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
   4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required".

PART 2 – PRODUCTS:

(Not Applicable)

PART 3 – EXECUTION:

(Not Applicable)

END OF SECTION 01 3300

QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section includes:
   1. Administrative and procedural requirements for quality control services.
   2. Selection and payment of agency.
   3. Responsibilities.
   4. Submittals.
   5. Quality Assurance.
   6. Schedule of testing and inspections.
   7. Special inspections required by Building Code.

B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include enforcement activities performed by the Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
   1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products, as well as customized fabrication and installation procedures.
   2. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
   3. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

E. Related Sections: Individual technical specification sections; Inspections and testing required, and standards for testing.

F. References:
   1. ANSI/ASTM D3470-01 Practice for Minimum Requirements for Agencies engaged in the testing and/or inspection for soil and rock as sued in engineering design and construction.
   2. ANSI/ASTM E329-02- Specification for Agencies engaged in the testing and/or inspection of materials used in construction.
   3. Current Minnesota State Building Code.
   4. International Building Code (IBC) 2006.

1.3 SELECTION AND PAYMENT OF AGENCY

A. The Contractor shall employ and pay an independent agency to perform specified quality control services per each individual technical specification section unless otherwise noted.

B. The Owner will engage and pay for the services of an independent agency to perform inspections and tests that are specified as the Owner's responsibility.

C. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related elements, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

D. Retesting: The Contractor is responsible for retesting where results of required inspections, tests of similar services prove unsatisfactory and do not indicate compliance with the Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.

1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

1.4 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not directly by the Contractor. Costs for these services shall be included in the Contract Sum.

B. Testing Agency Responsibilities: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect and Contractor in performing required inspections and tests.

1. Test samples submitted or obtained according to Contract Documents.
2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
3. Perform specified inspection, sampling, and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and work with requirements of the Contract Documents.
5. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies or nonconformance of work or products observed in the Work during performance of its services.
6. Perform additional inspections and tests required by Architect/Engineer.
7. Attend preconstruction conferences and progress meetings when instructed by Architect/Engineer.
8. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
9. The agency shall not perform any duties of the Contractor.

C. Contractor Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the testing agency at least 48 hours in advance of

operations to permit assignment of personnel. Auxiliary services include but are not limited to:

1. Cooperate with testing agency personnel.
2. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
3. Taking adequate quantities or representative samples of materials that require testing or assisting the agency in taking samples.
4. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
5. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
6. Security and protection of samples and test equipment at the Project site.

1.5 SUBMITTALS

A. Owner's Representative will coordinate third party testing agent by Owner. The testing agency will be determined prior to start of work.

B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards (NBS) during most recent tour of inspection, with memorandum of remedies of any deficiencies reported by inspection.

C. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Owner, Architect and Contractor, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to the following:
    a. Date of issue.
    b. Project title and number.
    c. Name, address and telephone number of testing agency.
    d. Dates and locations of samples and tests of inspections.
    e. Names of individuals making the inspection or test.
    f. Designation for the Work and test method.
    g. Identification of product and Specification Section.
    h. Complete inspection or test data.
    i. Test results and interpretations of test results.
    j. Ambient conditions at the time of sample-taking and testing.
    k. Comments or professional opinion as to whether inspected or tested work complies with requirements of the contract documents.
    l. Name and signature of laboratory inspector.
    m. Recommendations on retesting.

1.6 QUALITY ASSURANCE

A. Qualification Requirements for Service Agencies:

1. Comply with Referenced Codes and Standards in 1.2 Summary F. References.
2. Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended

Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

3. Maintain a full time registered professional engineer or certified specialist on staff to supervise services and preparation of reports and recommendations.
4. Maintain calibrated testing equipment at reasonable intervals with devices of and accuracy traceable to either National Bureau of Standards (NBS) tolerances or accepted values of natural physical constants.
5. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

1.7 SCHEDULE OF TESTING AND INSPECTIONS

A. Refer to "Field Quality Control" articles of the technical sections for testing and inspections required by the Contract Documents.

B. Prepare a tentative schedule of inspections and testing.

1.8 SPECIAL INSPECTIONS REQUIRED BY BUILDING CODE

A. In addition to the field quality control testing and inspection required by the Contract Documents for following special inspections shall be performed by the entity to be determined by Owner's Representative, in compliance and accordance with Chapter 17 of the 2006 International Building Code.

B. See "Special Inspection and Testing Schedule appended hereto. This form must be completed by the Architect/Engineer, attested by each entity performing special testing and inspections, and submitted by Contractor to Building Official and the Owner prior to issuance of the Building Permit.

PART 2 – PRODUCTS

(not applicable)

PART 3 – EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching".

B. Protect work exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01 4000

REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the General Conditions.

B. Indicated: The term “indicated” refers to graphic representations, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and similar requirements in the Contract Documents. Where terms such as “shown”, “noted”, “scheduled”, and “specified” are used in lieu of “indicated”, it is to help the reader locate the reference, and no limitation on location is intended.

C. Directed: Terms such as “directed”, “requested”, “authorized”, “selected”, “approved”, “required”, “accepted”, and “permitted” mean “directed by the Architect”, “requested by the “Architect”, and similar phrases. However, no such implied meaning shall be interpreted to extend Architect’s responsibility into the Contractor’s area of construction supervision.

D. Approve: The term “approved”, where used in conjunction with the Architect’s action on the Contractor’s submittals, applications, and requests, is limited to the Architect’s duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term “regulation” includes laws, statues, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry which control performance of the Work.

F. Furnish: The term “furnish” is used to mean “supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations”.

G. Install: The term “install” is used to describe operations at project site including the actual “unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations”.

H. Provide: The term “provide” means “to furnish and install, complete and ready for the intended use”.

I. Installer: An “Installer” is the Contractor or any entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term “experienced” when used with the term “Installer” means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

2. Trades: Using terms such as “carpentry” is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter”. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
    a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdiction settlements and similar conventions.

J. Project Site is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land upon which the Project is to be built.

K. Testing Laboratories: A testing laboratory is an independent entity engaged to perform specific inspections or tests either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 33 Division format and MASTERFORMAT 2012 Version numbering systems.

B. Specification Content: This specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words will interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
    a. The words "shall be" are implied wherever a colon (:) is sued within a sentence or phrase.

1.4 INDUSTRY STANDARDS

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

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

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where the standards may establish different or conflicting requirements for minimum

quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties as to the Architect for a decision before proceeding.

1. Minimum Quantities or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the “Encyclopedia of Associations”, published by Gale Research Co., available in most libraries.

1.5 GOVERNING REGULATIONS/AUTHORITIES

A. The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents; that information may or may not be of significance to the Contractor. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.

B. Copies of Regulations: Obtain copies of the following regulations and retain at the Project Site, available for reference by parties who have a reasonable need.

1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner’s records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with the compliance with standards and regulations bearing upon performance of the Work.

1. Building Construction Permit:
   a. The Construction Manager shall arrange and pay for the general construction permit for the entire project.
   b. The cost of the permit shall be included in the Construction Manager’s guaranteed maximum amount.
2. Additional Permits:
   a. All other contractors and individual subcontractors shall pay for any and all additional permits, licenses, inspections and fees required for the proper execution and completion of his particular portion of the work, including any sewer access charges and/or water access charges.

PART 2 – PRODUCTS

(not applicable)

PART 3 – EXECUTION

(not applicable)

END OF SECTION 01 4200

SPECIAL STRUCTURAL TESTING AND INSPECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Procurement and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 INTENT AND CONDITIONS

A. Define and coordinate structural testing and special inspection services.
   1. Contractor to facilitate coordination of all testing
   2. Define and coordinate conventional testing and inspection services.
   3. Provide greater confidence that the specified work is constructed in compliance with the contract documents and Chapter 17 of the 2018 International Building Code as adopted by the current Minnesota State Building Code.
   4. Testing and Inspection services are intended to assist in determining probable compliance of the work with requirements specified. These services do not relieve the Contractor of responsibility for compliance with the requirements of the contract documents.

B. Conditions
   1. If inspection of fabricator's work is required, the Owner's representative may require testing and inspection of the work at the plant, before shipment. Owner, Architect and Structural Engineer of Record (SER) reserve the right to reject material not complying with the contract documents.
   2. Testing and inspection shall be performed in accordance with the industry standard used as the reference for the specific material or procedure unless other criteria are specified. In the absence of a referenced standard, tests shall be accomplished in accordance with generally accepted industry standards.
   3. Work shall be checked as it progresses, but failure to detect any defective work or materials shall in no way prevent later rejection if defective work or materials are discovered, nor shall it obligate Owner to accept such work.

1.3. RELATED REQUIREMENTS

A. Refer to PART 3 for technical scope sections regarding specific qualifications, inspections, tests, frequency and standards required.

1.4 DEFINITIONS

A. Testing – Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.

B. Inspection – Evaluation of systems, primarily requiring observation and engineering judgment.

C. Structural Testing and Special Inspection – Structural Testing and Special Inspection Services herein include items required by the 2012 IBC as adopted by the current Minnesota

State Building Code, and other items which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure.

D. Conventional Testing and Inspection – Conventional Testing and Inspection Services herein describe those items not specially required by Code but may be considered essential to the proper performance of the building systems.
E. Architect of Record – The prime consultant in charge of overall design and coordination of the project.
F. Structural Engineer of Record (SER) – The Licensed Engineer in responsible charge of the structural design for the project.
G. Licensed Structural Engineer: – A professional engineer with education and experience in the design of structures similar to this project licensed to practice in the state in which the project is located.
H. Testing Agency (TA) – The properly qualified firm performing testing services.
I. Special Inspector (SI) – A properly qualified individual or firm performing special inspections.
    a. Special Inspector - Technical
        1) Technical I
        Technician shall be under the direct supervision of a Technical III. Work shall be performed in a qualified geotechnical/testing laboratory.
        2) Technical II
        Technical with a minimum of 2 years experience, or a graduate engineer, and is an employee of a qualified and approved geotechnical/testing laboratory, under the direct supervision of a Technical III.
        3) Technical III
        A civil/geotechnical engineer regularly engaged in this type of work with a minimum of 4 years experience, licensed in the State in which the project is located, and is an employee of a qualified and approved geotechnical/testing laboratory. This licensed engineer shall review and approve all final field reports.
    b. Special Inspector - Structural
        1) Structural I
        Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a Structural II.
        2) Structural II
        Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the State in which the project is located. The licensed engineer shall review and approve all inspection reports.
        3) Special Inspector - Structural may be an employee of the SER.

J. Building Official – The Officer or his duly authorized representative charged with the administration and enforcement of the Minnesota State Building Code.
K. Continuous –The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.
L. Periodic –The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

1.5 REFERENCES

A. ASTM E329-02 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
B. ASTM E43-02 - Standard Practice for Agencies Performing Nondestructive Testing.
C. ASTM C1077-02 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
D. ASTM C1093-95 - Practice for Accreditation of Testing Agencies for Unit Masonry.
E. ASTM D3740-01 - Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
F. International Building Code (2012)
G. Minnesota State Building Code (2015).
H. See technical sections of PART 2 for specific references.

1.6 QUALIFICATIONS

A. Testing Agency (TA) – The testing agency shall be an approved independent testing agency acceptable to the Owner, Architect, SER and as noted below:
1. Authorized to operate in the state in which the project is located and experienced with the requirements and testing methods specified in the technical scope sections of PART 2.
2. Meeting applicable requirements of Section 1.04 "References".
3. Testing equipment shall be calibrated at reasonable intervals by devices of accuracy traceable to either the National Bureau of Standards, or to accepted values of natural physical constants.

B. Special Inspector (SI) – The special inspector shall be under the direct supervision of a registered civil/structural engineer, experienced with the type of work requiring structural testing and special inspection.
1. The categories of special inspector are:
a. Special Inspector - Technical I, II, and III: Usually an employee of a testing agency.
b. Special Inspector - Structural I and II: Preferably an employee of the SER's firm.
2. Unique special inspector requirements, for specific materials and system, are noted in related technical specification sections.

1.7 RESPONSIBILITIES

A. Structural Testing and Special Inspection
1. Special Inspectors:
a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.
b. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
c. Test and/or inspect the work assigned for conformance with the building department approved design drawings, specifications and applicable material and workmanship provisions of the Code. Perform testing and inspection in a timely manner to avoid delay of work.
d. Bring discrepancies to the immediate attention of the contractor for correction, confirm that they are corrected and, if uncorrected after a reasonable period of time, bring to the attention of the Structural Engineer of Record, the Building Official, and to the Architect.
e. Submit test and/or inspection reports to the Building Official, Contractor, the Structural Engineer of Record, and other designated persons in accordance with the Structural Testing and Special Inspection Summary Schedule.

f. Submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications and the applicable workmanship provisions of the Code.

2. Testing Agency:
   a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.
   b. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
   c. When engaged as a special inspector, provide structural testing and special inspection services as previously described.
3. Architect of Record (or other prime consultant):
   a. Complete and sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction. Provide a completed copy of the schedule to all signed parties including Building Official.
   b. If appropriate, arrange and attend a pre-construction meeting to review the scope of structural testing and special inspection. Include Contractor, Building Official, SER, Testing Agency and other parties concerned.
   c. Coordinate the flow of reports and related information to expedite resolution of construction issues.
4. Structural Engineer of Record (SER):
   a. Identify items requiring structural testing and special inspection including special cases.
   b. Define "type" of special inspector required for "description" of work indicated on the structural testing and special inspection schedule.
   c. Complete and sign the Structural Testing and Special Inspection Summary Schedule prior to commencement of construction.
   d. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
   e. Review reports submitted by special inspectors.
   f. If engaged as a special inspector, provide structural testing and special inspection services as previously described.
5. Contractor:
   a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.
   b. If requested, attend a pre-construction meeting to review the scope of structural testing and special inspection.
   c. Post or make available the Structural Testing and Special Inspection Summary Schedule within its office at the job site. Also, provide adequate notification to those parties designated on the schedule so they may properly prepare for and schedule their work.
   d. Provide the special inspectors access to the approved drawings and specifications at the job site.
   e. Review reports submitted by special inspectors.
   f. Retain at the job site all reports submitted by the special inspectors for review by the building official upon request.
   g. Correct in a timely manner, deficiencies identified in inspection and/or testing reports.
   h. Provide the special inspector safe access to the work requiring inspection and/or testing.
   i. Provide labor and facilities to provide access to the work and to obtain, handle and deliver samples, to facilitate testing and inspection and for storage and curing of test samples.
   j. Verification of conformance of the work within specified construction tolerances is solely the Contractor's responsibility.

6. Fabricator:
   a. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencing construction.
   b. Submit a Certificate of Compliance to the Building Official, Special Inspector, and Structural Engineer of Record that the work was performed in accordance with the approved plans and specifications.
7. Building Official (Typical responsibilities noted for information only):
   a. Determine work, which in the Building Officials opinion, involves unusual hazards or conditions in accordance with the IBC.
   b. Review special inspector qualifications.
   c. Accept and sign the completed Structural Testing and Special Inspection Summary Schedule.
   d. Review all fabricators who perform work in their shop, which requires special inspection.
   e. Review reports and recommendations submitted by the special inspectors.
   f. Review the "final signed reports" submitted by the special inspector(s). These documents should be accepted and approved by the building department prior to issuance of a Certificate of Occupancy.
8. Owner:
   a. Establish direct funding to provide for cost of structural testing and special inspection services.
   b. Provide special inspector with approved design drawings, specifications and approved shop drawings.
   c. Provide special inspectors and testing agencies with full access to site at all times.
   d. Sign the Structural Testing and Special Inspection Summary Schedule in conjunction with other responsible parties prior to commencement of construction.

B. Conventional Testing and Inspection
1. Testing Agency:
   a. Test or inspect the work assigned, for conformance with building department approved plans, specifications and applicable workmanship provisions of the IBC.
   b. Bring non-conforming items to the immediate attention of the Contractor, and if uncorrected to the Architect of Record.
   c. Submit test and/or inspection reports to the Architect of Record, the Contractor and other designated persons.
2. Contractor:
   a. Provide adequate notification to testing agency so they may properly prepare for and schedule their work.
   b. Provide testing agency with access to the approved design drawings, approved shop drawings and specifications at the job site.
   c. Correct in a timely manner, deficiencies identified in test and/or inspection reports.
   d. Provide testing agency with safe access to the work requiring testing and inspection.
   e. Provide labor and facilities to provide access to the work and to obtain and handle samples, to facilitate testing and inspection and for storage and curing of test samples.
   f. Verification of conformance of the work within specified construction tolerances is solely the Contractor's responsibility.
3. Architect of Record (or other prime consultant):
   a. Coordinate the flow of reporting and related information to expedite resolution of construction issues.

C. Inspections by Building Official
1. Contractor shall provide adequate notice for inspections performed by the Building Official, as required by the 2012 IBC, the Minnesota State Building Code, and local ordinance.

D. Periodic Site Observations by Design Consultant
1. Special structural testing and inspection, conventional testing and inspection, and periodic

inspections by the Building Official do not preclude the normal field involvement and site observations by Architect or Structural Engineer of Record, nor shall it relieve the Contractor of any responsibility to complete the work in accordance with the approved drawings and specifications.

E. Limits of Authority
1. Testing agents and/or special inspectors may not waive or alter contract requirements, or approve or accept any portion of the work unless specifically authorized by the Architect or Structural Engineer of Record. They may not assume any duties of the Contractor, and they have no authority to stop or reject "Work".

1.8 PAYMENT
A. Contractor shall directly employ and pay for services of the special inspectors to perform required Structural Testing and Special Inspection.
B. Contractor shall employ and pay for services of the testing agency to perform required Conventional Testing and Inspection.
C. Unless noted otherwise, the Contractor shall provide and pay for all materials, samples, mock-ups, and assemblies required for testing and inspection and shall pay for all shipping costs related to delivery of this work. Testing agency will pay for shipping costs of samples transported from site to lab.
D. If exploratory work is required to determine the cause of defects, the cost of such work shall be paid by the Contractor, if the work is found to be defective, in the judgment of the Architect/Engineer. Contractor shall reimburse the Owner for all costs incurred in this event.
E. Any tests required to qualify the Contractor, or the workmen for any phase of the work, shall be performed at no additional cost to the Owner.

1.9 INSPECTION NOTICE
A. Contractor shall provide minimum of 24 hours notice for all items requiring testing or inspection. Items requiring testing and inspection services prior to or during placement shall not be placed until testing and inspection services are available. Items requiring testing and inspection services after placement shall not be enclosed or obscured until testing and inspection services are performed.

1.10 REPORTS
A. Testing agency and/or special inspectors shall submit reports in accordance with the Structural Testing and Special Inspection Summary Schedule and shall conduct and interpret tests and inspections and state in each report whether; (1) test specimens and observations comply with Contract Documents, and specifically state any deviations, (2) record types and locations of defects found in work, (3) record work required and performed, to correct deficiencies.
B. Reports for structural testing and special inspection, shall be submitted in timely manner to the Contractor, Building Official, SER, and Architect of Record.
1. Submit reports for ongoing work, to provide the information noted below:
a. Date issued.
b. Project title and number.
c. Firm name and address.
d. Name and signature of tester or inspector.
e. Date and time of sampling.
f. Date of test or inspection.
g. Identification of product and specification section.
h. Location in project, including elevations, grid location and detail.
i. Type of test or inspections.
j. Results of tests or inspections and interpretation of same.
k. Observations regarding compliance with Contract Documents or deviations there from.
2. Submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications and the applicable workmanship provisions of the code.

C. Reports for conventional testing and inspection shall be submitted in a timely manner to the Contractor and the Architect of Record.

1.11 FREQUENCY OF TESTING AND INSPECTION

A. For detailed requirements see technical sections of PART 3.

1.12 PROTECTION AND REPAIR

A. Upon completion of testing, sample-taking, or inspection, the Contractor shall repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed surfaces, as judged solely by the Architect/Engineer of Record. Protect work exposed by or for testing and/or inspection and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for testing and/or inspection.

1.13 TESTS TO DEMONSTRATE QUALIFICATION

A. If the Contractor proposes a product material, method, or other system that has not been pre-qualified, the Architect may require applicable tests, to establish a basis for acceptance or rejection. These tests will be paid for by the Contractor.

B. The Architect/Engineer of Record reserves the right to require certification or other proof that the system proposed, is in compliance with any tests, criteria or standards called for. The certificate shall be signed by a representative of an independent testing agency.

PART 2 – NOT USED

PART 3 - SCOPE OF TESTING AND INSPECTION

3.1 STRUCTURAL TESTING AND SPECIAL INSPECTION PROGRAM SUMMARY

A. The parties involved shall complete and sign the Structural Testing and Special Inspection Summary Schedule. The Program, including Summary Schedule, shall be submitted to the building official for approval prior to issuance of a building permit. The competed schedule includes the following:

1. A specific listing of the items requiring inspection and testing.
2. The associated technical scope sections that define the applicable standards by which to judge conformance with the approved plans and specifications in accordance with the IBC, as adopted by the Minnesota State Building Code. The technical scope sections should also include the degree or basis of inspection and testing; i.e., intermittent/will-call or full-time/continuous.
3. The frequency of reporting, i.e., weekly, monthly, per test/inspection, per floor, etc.
4. The parties responsible for performing the inspection and testing work.
5. The required acknowledgments by each designated party.

3.2 CONVENTIONAL TESTING AND INSPECTION

A. (Not Used)

Structural Testing and Special Inspection
Statement of Special Inspections

Project Name: Central Square:Rehabilitation
Location: 105 2nd Ave. NE, Glenwood, MN
Owner: Central Square, Inc., Glenwood, MN

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the 2012 International Building

Code as adopted by the current Minnesota State Building Code. It includes a schedule of Special Inspection services applicable to this project and the identity of agencies to be retained for conducting these inspections and tests. This *Statement of Special Inspections* encompasses the following disciplines:

☒ Structural ☐ Architectural ☐ Other: _____

The Special Inspector shall keep records of all inspections and shall furnish inspection reports to the Building Official, the Architect and Structural Engineer of Record. Discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official, the Architect and SER. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official the Architect and SER.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

ACKNOWLEDGEMENTS

Each appropriate representative shall sign below:

Owner: _____	Firm: _____	Date: _____
Contractor: _____	Firm: _____	Date: _____
Architect: _____	Firm: _____	Date: _____
SER: _____	Firm: _____	Date: _____
SI-S: _____	Firm: _____	Date: _____
SI-T: _____	Firm: _____	Date: _____
TA: _____	Firm: _____	Date: _____
F: _____	Firm: _____	Date: _____

If requested by engineer/architect of record or building official, the individual names of all prospective special inspectors and the work they intend to observe shall be identified.

Legend: SER = Structural Engineer of Record
SI-T = Special Inspector - Technical
TA = Testing Agency
SI-S = Special Inspector - Structural
F = Fabricator

Accepted for the Building Department By _____
Date _____

Structural Testing and Special Inspection

Program Summary Schedule

Project Name Central Square: Rehabilitation Project No. _____
Location Glenwood, MN Permit No. _____ (1)

Refer to Structural plans for table of required testing.

END OF SECTION 01 4533

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TEMPORARY FACILTIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 DESCRIPTION OF REQUIREMENTS

A. This section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

B. Owner will allow use of existing electrical power and water. Contractor is responsible for connections to existing and to guard against waste. In the event existing facilities are not readily available, contractor to provide temporary facilities at no additional cost to the owner.

C. Temporary utilities required include but are not limited to:

1. The owner will allow use of, and the extension of, temporary utilities from existing services, subject to proper use and safety precautions.
2. Water service and distribution.
3. Temporary electric power and light.
4. Telephone service.
5. Storm and sanitary sewer.
6. Existing public toilet in Building may be utilized during construction during normal business hours. Contractor must keep toilet room in clean, sanitary condition or use of toilet will be denied and contractor will be required to provide portable toilet.

D. Temporary construction and support facilities required include but are not limited to:

1. Temporary heat.
2. Field offices and storage sheds.
3. Temporary roads and paving.
4. Sanitary facilities, including drinking water.
5. Dewatering facilities and drains.
6. Temporary enclosures and temporary window, door, opening coverings to separate the work areas from the adjacent occupied spaces.
7. Hoists and scaffolds.
8. Temporary project identification signs and bulletin boards.
9. Waste disposal services.
10. Construction aids and miscellaneous general services and facilities.

E. Security and protection facilities and services required include but are not limited to:

1. Temporary fire protection.
2. Barricades/Barriers and Enclosures.
3. Environmental protection.
4. Protection of existing materials, finishes and systems to remain.

1.3 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including but not limited to the following:

1. Building Code requirements.

2. Health and safety regulations.
3. Police, Fire Department and Rescue Squad rules and recommendations.
4. Environmental protection regulations.

B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."

1.4 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide only materials suitable for the use intended.

B. Lumber and Plywood: Comply with requirements in Division -06 Section "Rough Carpentry."

1. For job-built temporary enclosures, offices, shops, sheds, walks, ramps and chutes, within the construction area, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
2. For signs and directory boards, provide exterior type, Grade B-B High density concrete form overlay plywood conforming to PS-1, of sizes and thickness indicated.

C. Poly Film:

1. Laminated polyethylene sheets reinforced with nylon fibers for use as temporary coverings for window and door openings.
2. Provide removable mastic adhesive or removable tape adhesive to secure poly film to perimeter of each opening.

D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with a flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforce laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

E. Water: Provide potable water approved by local health authorities.

F. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6 feet high with galvanized barbed wire top strand and galvanized steel pipe posts. 1-1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

G. Gypsum Board: Minimum ½" thick by 4'-0" wide by maximum available lengths; regular type panels with tapered edges. Comply with ASTM C 36.

H. Insulation: Unfaced mineral fiber blanket manufactured from grass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively.

I. Paint: Comply with requirements in Division 9 Section “Painting”.

2.2 EQUIPMENT

A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.

B. Water Hoses: Provide heavy-duty, abrasion-resistant, flexible rubber hoses, with a pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-220 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

D. Electric Power Cords: Provide grounded extension cords; use “hard-service” cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where fixtures are exposed to breakage. Provide exterior fixtures where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

G. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.

H. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar non-absorbent material.

I. First Aid Supplies: Comply with governing regulations.

J. Fire Extinguishers: Provide hand-carried, portable UL-rated, Class “A” fire extinguishers for temporary facilities and similar spaces. In other locations provide hand-carried, portable, UL-rated, Class “ABC” dry chemical extinguishers, or a combination of extinguishers of NFPA recommended types for the exposures.

1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITITY INSTALLATION

A. General: Engage the appropriate utility company to install temporary service or connect to existing service. Where the company provides only a part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
   1. Arrange with the Owner and existing users for a time when service can be interrupted, where necessary, to make connections for temporary service.
   2. Provide adequate capacity at each stage of construction.

B. Use Charges: Cost of use charges for temporary facilities are not chargeable to the Owner or Architect, and will not be accepted as basis of claims for a Change Order.

C. Water Service: Install water service and distribution piping from the Owner's existing service, of sizes and pressures adequate for construction until permanent water service is in use.
   1. Sterilization: Sterilize temporary water piping prior to use.

D. Temporary Electric Power Service: Provide a weatherproof, grounded electric power service and distribution system from the Owner's existing service, of sufficient size, capacity, and power characteristics during construction period. Include transformers, overload protected disconnects, automatic ground-fault interrupters and distribution switch gear.
   1. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

   Where available, contractor may utilize existing available power in building. Contractor must guard against waste.

E. Temporary Lighting: Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching.
   1. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.

F. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants.
   1. At each telephone location post a list of important telephone numbers.

G. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, waste stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.
   1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
   2. Connect temporary sewers to the municipal sewer systems as directed by the sewer department officials.
   3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

H. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding of the work by runoff of storm water from heavy rains.

3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

A. General: Locate field offices, storage and fabrication sheds and other support facilities for easy access.

1. Maintain temporary construction and support facilities near substantial completion time. Remove prior to substantial completion. Personnel remaining after substantial completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

B. Provide incombustible construction for offices, shops, and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.

C. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:

1. Furnish with a desk and chairs, file cabinet, plan table, plan rack and bookcase.

D. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize the consumption of energy.

E. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.

F. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Furnish and equip offices as follows:

1. Furnish with a desk and chairs, file cabinet, plan table, plan rack and bookcase.

G. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped, to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces, within the building or elsewhere on the site.

H. Temporary Paving: Construct and maintain temporary roads and paving to adequately support the indicated loading and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas and temporary parking, where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.

I. Paving: Comply with Division 31 Section “Asphalt Concrete Paving” for construction and maintenance of temporary paving.

1. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of the sub-base, and installation of the base and finish courses of the permanent paving.

2. Install temporary paving to minimize the need to rework the installations and to result in the permanent roads and paved areas that will be without damage or deterioration when occupied by the Owner.
3. Delay installation of the final course of permanent asphalt concrete paving, until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
4. Extend temporary paving in and around the site construction area as necessary to accommodate the delivery and storage of materials, equipment usage, administration and supervision.

JI. Sanitary Facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the project's needs.

1. Provide toilet tissue and paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used materials.

K. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

L. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

1. Provide safety showers, eye-wash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

M. Drinking Water Facilities: Provide containerized tap-dispenser bottled water type drinking water units, including paper supply.

N. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division -31 sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.

O. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
4. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.

P. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

Q. Project Identification and Temporary Signs: Prepare project identification and other signs of the size indicated; install signs where indicated to inform the public and persons seeking entrance to the project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
2. Temporary Signs: Prepare signs to provide directional information construction personnel and visitors.
    a. Access roads and parking.
    b. Offices and first aid stations.
    c. Hoists.
    d. Sanitary facilities.
    e. Telephones.
    f. Emergency exits.
    g. Fire protection facilities.
    h. Barricades and obstructions.
    i. Hazardous elements of construction work.

R. Collection and Disposal of Wastes: Other than as indicated in Section 01 11 00 – Summary, for stockpiling and removal of demolition materials, collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials at the site longer than 7 days during normal weather or 3 days when the daily temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste separately from other waste by containerizing appropriately. Dispose of waste material in a lawful manner.

1. To prevent vandalism, the Contractor shall remove waste from the site at the end of each work day, or store waste in a secure, enclosed trailer or similar facility. The contractor may propose another method subject to approval by the owner.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to use of permanent facilities until substantial completion, or longer as requested by the Architect.

B. Temporary Fire Protection: Maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with the applicable recommendations of NFPA 10 “Standard for Portable Fire Extinguishers,” and NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations.”

1. Locate fire extinguishers where convenient and effective for their intended purpose, but provide not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in recognized fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

C. Permanent Fire Protection: At the earliest feasible date in each area of the project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

E. Enclosure Fence: When excavation begins install a enclosure fence with lockable entrance gates. Locate where indicated, or if not indicated, enclose the entire site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent persons, dogs and other animals from easily entering the site, except by the entrance gates.

1. Provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth.

F. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances adequate to prevent unauthorized entrance, vandalism, theft and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or are attractive for theft, provide a secure lockup and enforce strict discipline in connection with the installation and release of material to the opportunity for theft and vandalism.

G. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and that minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid the use of tools and equipment which product harmful noise. Restrict the use of noise making tools and equipment to hours of use that will minimize noise complaints from persons or firms near the site.

H. Protection of Existing Materials, Finishes, and Systems: Provide protection as required for existing materials and systems to remain during removals, demolition, repairs, renovations, cleaning and the installation of new materials and systems.

1. Protect existing roofing systems and materials from damage during the course of all work, by use of insulation and plywood coverings, or other means approved by the Owner and Architect. Do no apply point loads to roofing systems or distributed loads in excess of the existing systems loading capacities.
2. Protect all existing finishes, materials to remain and other site improvements.

I. Barriers:

1. During any demolition operation the contractor shall erect temporary enclosures, barricades, fences or such protective structures as required to enclose the space or construction area and to provide protection to the public. Such enclosures shall be constructed in a manner to preclude normal access to the construction area by unauthorized persons. Such enclosures shall be constructed in a manner to provide and maintain a “dust free” barrier and prevent dust debris from migrating to adjacent or adjoining spaces.

2. Temporary barriers are to include blocking off any existing openings in existing or new walls, floors and mechanical ducts and mechanical/electrical shafts that will allow dust and/or debris to migrate to any other space or floor area in the building.
3. If dust and debris does migrate or affect other spaces in the building due to the operations of the Contractor, the Contractor shall be responsible for the prompt clean up of the other spaces. If the Contractor fails to promptly clean the affected adjoining spaces the Owner shall have the option to the clean the affected spaces and charge the cost of this cleaning to the Contractor from moneys due to the Contractor or from moneys that are to become due to the Contractor.

3.5 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Operate and maintain temporary facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces and replace construction which cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary services and facilities are the property of the Contractor. The Owner reserves the right to take possession of the project identification signs.
   2. Remove temporary roads and paving materials which are not intended for or acceptable for integration into permanent paving. Where the area shown is intended for landscape development, remove soil and aggregate fill that does not comply with requirements for fill or subsoil in the landscape area. Remove materials contaminated with road oil, asphalt and other petro-chemical compounds, and other substances which might impair growth of plant materials or lawns. Repair or replace street paving, curbs and sidewalks at the temporary entrances, as required by the governing authority.
   3. At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period, including but not limited to the following:
      a. Replace air filters and clean the inside of ductwork and housings.
      b. Replace significantly worn parts and pieces that have been subject to unusual operating conditions.
      c. Replace lamps in the lighting system that are burned out or noticeably dimmed by substantial hours of use.
   4. At substantial completion, clean and renovate permanent services and facilities that have been used to provide temporary services and facilities during the construction period.

END OF SECTION 01 50 00

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PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project and for handling requests for prior approvals and substitutions made after award of the contract.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Standards: Refer to Division 01 Section "References" for applicability of industry standards to products specified.
2. Submittals: Refer to Division 01 Section "Submittal Procedures" for submittal of Contractor's Construction Schedule and Submittal Schedule.

1.3 DEFINITIONS

A. Definitions used in this article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories", and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material", "equipment", "system", and terms of similar intent.
   a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature that is current as of the date of the Contract Documents.
2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.
3. "Equipment" is a product with operational parts, whether motorized for manually operated, that requires service connections such as wiring or piping.
4. "Substitutions": Requests for changes in products, materials, equipment and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions". The following are not considered substitutions.
   a. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as include in the Contract Documents and are subject to requirements specified in this section for "Prior Approval".
   b. Revisions to the Contract Documents, requested by the Owner or Architect.
   c. Specified options of products and construction methods included in the Contract Documents.

d. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Product List: Prepare a schedule showing products specified in a tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.

1. Coordinate the product list with the Contractor's Construction Schedule and the Schedule of Submittals.
2. Form: Prepare product list with information on each item tabulated under the following column headings.
   a. Related Specification Section number.
   b. Generic name used in Contract Documents.
   c. Proprietary name, model number, and similar designations.
   d. Manufacturer's name and address.
   e. Supplier's name and address.
   f. Installer's name and address.
   g. Projected delivery date or time span of delivery period.
3. Initial Submittal: Within 14 days after the date of Notice to Proceed, submit 3 copies of an initial product list. Provide a written explanation for omissions of data, and for known variations from Contract requirements.
   a. At the Contractor's option, the initial submittal may be limited to product selections and designations that must be established early in the Contract period.
4. Completed Schedule: Within 28 days after the Notice to Proceed, submit 3 copies of the completed product list. Provide a written explanation for omissions of data, and for known variations from Contract requirements.
5. Architect's Action: The Architect will respond in writing to Contractor within 2 weeks of receipt of the completed product list. No response within this period constitutes an objection to listed manufacturers or products but does not constitute a waiver of the requirement that products comply with the Contract Documents. The Architect's response will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.

B. Prior Approval Request Submittal: Requests for Prior Approval will be considered only if received at least 10 days prior to the Bid opening date. Requests received less than 10 days prior to the Bid opening date may be considered or rejected at the discretion of the Architect.

1. Submit 3 copies of each request for Prior Approval for consideration.
2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the Contract Documents, and the following information, as appropriate.
3. Product Data, including Drawings and descriptions of products, fabrication and installations procedures, and certified test results attesting to the proposed product equivalence.
4. Samples, where applicable or requested.

5. Architect's Action: A minimum of 3 days before the Bid opening date, the Architect will indicate the acceptance, or Prior Approval of any approved products by Addendum.

C. Substitution Request Submittal: Requests for substitution will be considered if received within 30 days after commencement of the Work. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the Architect.

1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.
2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    a. Product Data, including Drawings and descriptions of products, fabrication and installations procedures, and certified test results attesting to the proposed product equivalence.
    b. Samples, where applicable or requested.
    c. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitutions.
    d. A statement indicating the substitutions effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    e. Cost information, including a proposal of the net change, if any in the Contract Sum.
    f. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become apparent or necessary because of the failure of the substitution to perform adequately. A request constitutes a representation that the Contractor:
        1) Will provide the same warranty for the substitution as for the specified product.
        2) Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
        3) Will reimburse Owner for review or re-design services associated with re-approval by authorities.
        4) Will reimburse the Owner for excessive review or re-design services required of the Architect in order to accommodate the proposed product.

3. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.
4. Architect's Action: Within one week of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, which ever is later, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance will be in the form of a Change Order.
5. Testing: If the Architect is not familiar with the products for which substitution is sought, the Architect reserves the right to have those products submitted to an independent testing agency of the Architect's choosing to determine compliance with the requirements of the contract documents. The costs for such testing shall be borne by the Contractor or parties requesting the substitution.

1.5 PRIOR APPROVALS AND SUBSTITUTIONS

A. Prior Approval: Prior to the bid opening the Architect will consider requests for proposed product substitutions when such requests are submitted, in writing, in compliance all with requirements of this Section, ten days prior to the bid opening date. In addition to the conditions indicated in Article 1.4.A, prior approval of product substitutions will be considered for the following conditions.
   1. The request is directly related to an "or approved equal" clause or similar language in the Contract Documents.
   2. Requests directly related to an "or approved equal" clause or similar language in the Contract Documents must be submitted and approved prior to the bid opening.
   3. Approval of Substitutions is required: Do not substitute items unless such substitution has been specifically approved in writing for this work by the Architect.
   4. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate valid request for substitution, nor does it constitute approval.
   5. Where the phrase "or approve equal" or similar occurs in the Contract Documents, it does not indicate that materials, equipment, methods, etc., meeting such conditions in the opinion of the Contractor will be automatically approved by the Architect. All substitutions must be approved in writing for this project by the Architect.

B. Substitutions: After the Contract Award, the Contractor may propose Substitutions due to one or more of the specified conditions. Substitutions will be considered only under one or more of the following conditions:
   1. When a product becomes unavailable through no fault of the Contractor.
   2. It is required for compliance with subsequent code requirements or insurance regulations.

3. Subsequent information discloses inability of specified product(s) to perform properly or to fit in the designated space.
4. Manufacturer/fabricator refuses to certify or guarantee performance of specified product as required.
5. The Specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.
6. The specified product or method of construction cannot receive necessary approval b y a governing authority, and the requested substitution can be approved.
7. A substantial advantage is offered to the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
10. Where a proposed substitution involves more than one prime Contractor, each Contractor shall cooperate with the other Contractors involved to coordinate the Work, provide uniformity and consistency, and to assure compatibility of products.

C. Conditions: The Contractor's prior approval or substitution request will be received and considered by the Architect only when the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.

1.6 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
1. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect for a determination of the most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability or compatibility. When a determination has been made, select products from sources that product products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project; the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery to minimize with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
3. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 – PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
2. Standard Procedures: Where available, provide standard products of types that have been produced and used successfully in similar situations on other products.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:

1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
2. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.

a. Where products or manufacturers are specified by name, accompanied by the term “or equal” or “approved equal”, comply wit the Contract Document provisions concerning “substitutions” to obtain approval for use of an unnamed product.

3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of any of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning “substitutions” to obtain approval for use of an unnamed product.
4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without sue of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
   a. Manufacturer’s recommendations may be contained in published product literature, or by the manufacturer’s certification of performance.
6. Compliance with Standards, Codes, and Regulations: Where the Specifications only requires compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
7. Visual Meeting: Where Specification requires matching an established Sample, the Architect’s decision will be final on whether a proposed product matches satisfactorily.
   a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning “substitutions” for selection of a matching product in another product category, or for noncompliance with specified requirements.
8. Visual Selection: Where specified product requirements include the phrase “…as selected from manufacturer’s standard colors, patterns, textures…” or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
9. Allowances: Refer to individual Specification Sections and “Allowance” provisions in Division 01 for allowances that control product selections and of procedures required for processing such selections.

PART 3 – EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 6000

CUTTING AND PATCHING

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. General: This section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements of this Section apply to mechanical and electrical installation. Refer to Division 21 through Division 33 Sections for other requirements and limitations applicable to cutting and patching of mechanical and electrical installations.

C. Demolition of selected portions of the building for alterations is included in Section "Selective Structure Demolition."

1.3 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and how it is to be performed; indicate why cutting and patching cannot be avoided.
2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
3. List products to be used and firms or entities that will perform Work.
4. Indicate dates when cutting and patching is to be performed.
5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with original structure.
7. Approval by the Architect to proceed with cutting and patching work does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.4 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
   a. Foundation construction.
   b. Bearing and retaining walls.

c. Structural concrete.
d. Structural Steel
e. Lintels.
f. Timber and primary wood framing.
g. Structural decking.
h. Stair systems.
i. Miscellaneous structural metals.
j. Exterior curtain wall construction.
k. Equipment supports.
l. Piping, ductwork, vessels and equipment.
m. Structural systems of special construction in Division-13.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in a reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Use materials that are identical to existing materials. If identical materials are not available, or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION:

3.1 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations. Coordinate installation of new materials to avoid exposure when possible.

C. Avoid interference with use of adjoining areas of interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete work without delay.
   1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.
   1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
   3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
   4. Comply with requirements of applicable Sections of Division 31 where cutting and patching requires excavating and backfilling.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
   1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
   2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
      a. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after patched area has received primer and base coat.
   4. Patch, repair or re-hang existing ceilings as necessary to provide an even, plane surface of uniform appearance.

3.4 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 7329

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CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for project closeout, including but not limited to:
   1. Inspection procedures.
   2. Project record document submittal.
   3. Operating and maintenance manual submittal.
   4. Submittal of warranties.
   5. Final cleaning.

B. Closeout Requirements for specific construction activities are included in the appropriate sections in Divisions 02 through Division 33.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of substantial completion, complete the following. List exceptions in the request.
   1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent (100%) completion for the portion of the Work claimed as substantially complete.
      a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
      b. If 100 percent (100%) completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   2. Advise Owner of pending insurance change-over requirements.
   3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
   4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
   5. Deliver tools, spare parts, and extra stocks of material and similar items.
   6. Make the final change-over of permanent locks and transmit the keys to the Owner. Advise the Owner’s personnel of the change-over in security provisions.
   7. Complete start-up testing of systems, and instruction of the Owner’s operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

B. Walk-through: Upon receipt of a request for walk-through, the Architect will either proceed with walk-through or advise Contractor of unfulfilled requirements. The Architect will prepare the Certificate of Substantial Completion Following inspection, or advise the

Contractor of construction which must be completed or corrected before the certificate will be issued.

1. The Architect/Engineer will repeat the walk-through when requested and assured that the Work has been substantially completed.
2. Results of the completed walk-through will form the basis for final acceptance.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final walk-through for certification of final acceptance and final payment, complete the following. List exceptions in the request:
   1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
   2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
   3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and the list has been endorsed and dated by the Architect.
   4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of substantial completion, or else when the Owner took possession of and responsibility for corresponding elements of Work.
   5. Submit consent of surety to final payment.
   6. Submit a final liquidated damages settlement statement.
   7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedures: The Architect will walk through the Work again upon receipt of notice that the work, including walk-through list of items from earlier reviews has been completed, except items whose completion has been delayed because of circumstances that are acceptable to the Architect.
   1. Upon completion of the second walk-through, the Architect will prepare a certificate of final acceptance, or will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
   2. If necessary, the second walk-through will be repeated.

1.5 WARRANTY REQUIREMENTS

A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. Definitions:
   1. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and specifically endorsed by the manufacturer to the Owner.
   2. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

C. Related Damages and Losses: When correcting warranted Work that has failed, remove ore replace construction that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

D. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or building, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

E. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful life.

F. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which Owner can enforce such other duties, obligations, rights, or remedies.

G. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept Work, until the Contractor presents evidence is presented that entities required to countersign such commitments are willing to do so.

1.6 SUBMITTALS

A. Record Documents

1. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location. Provide access to record documents for the Architect's reference during normal working hours.
2. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
    a. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work.
    b. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
    c. Note related Change Order numbers where applicable.
    d. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
3. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction.
    a. Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications.

b. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later date by direct observation.
c. Note related record drawing information and product data.
d. Upon completion of the Work, submit record specifications to the Architect for the Owner's records.

4. Record Product Data: Maintain one copy of each product data submittal. Note related Change Orders and markup of record drawings and Specifications.
   a. Mark these documents to show significant variations in actual Work performed in comparison with the information. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.
   b. Give particular attention to concealed products and portions of the Work which cannot be readily discerned later by direct observation.
   c. Upon completion of marking, submit complete set of record product data to the Architect for the Owner's records.
5. Record Sample Submittal: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to Owner's sample storage area.
6. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.
7. Maintenance Manuals: Submit 2 copies of the maintenance manuals to the Architect for review and forwarding to the Owner. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data into individual, heavy-duty, 2-inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder. Include the following types of information:
   a. Emergency instructions.
   b. Spare parts listing.
   c. Copies of warranties.
   d. Wiring diagrams.
   e. Recommended "turn-around" cycles.
   f. Inspection procedures.
   g. Shop drawings and product data.
   h. Fixture lamping schedule.

B. WARRANTY AND BOND SUBMITTALS
1. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial

Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

a. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.

2. Forms for special warranties are included at the end of the corresponding Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and Subcontractor, Supplier or Manufacturer. Submit a draft to the Owner through the Architect for approval prior to final execution.
   a. Refer to individual Sections of Division 02 through 33 for specific content requirements, and particular requirements for submittal of special warranties.
3. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, Subcontractor, supplier or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
4. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2” x 11” paper.
   a. Provide heavy paper dividers with celluloid tables for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
   b. Identify each binder on the front and spine with the typed or printed title “WARRANTIES”, Project Title or name, and name of Contractor.
   c. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS

(not applicable)

PART 3 – EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner’s personnel to provide instruction in proper operation and maintenance. If installers are not experienced in the required procedures, provide instruction by the manufacturer’s representatives. Include a detailed review of the following items.
   1. Maintenance manuals.
   2. Record documents.
   3. Spare parts and materials.
   4. Tools.

5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective and energy utilization.

3.2 WARRANTY REQUIREMENTS

A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. Definitions:
1. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and specifically endorsed by the manufacturer to the Owner.
2. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

C. Related Damages and Losses: When correcting warranted Work that has failed, remove ore replace construction that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

D. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or building, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

E. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful life.

F. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which Owner can enforce such other duties, obligations, rights, or remedies.

G. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept Work, until the

Contractor presents evidence is presented that entities required to countersign such commitments are willing to do so.

3.3 FINAL CLEANING

A. General: General cleaning during the construction is required by the General Conditions and included in Section "Construction Facilities and Temporary Controls".

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
    a. Remove labels which are not required as permanent labels.
    b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances which are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
    c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
    d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
    e. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor plated, to a smooth, even-textured surface.

C. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.

D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

3.4 SCHEDULE OF WARRANTIES

A. Schedule: Provide warranties and bonds on products and installations as specified in each Specification Section.

END OF SECTION 01 7700

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SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of an exterior sidewalks, site improvements, concrete curb & gutter and landscape area.
   2. Patching and repairs.

B. Related Work Specified elsewhere:
   1. Division 01 Section “General Project Requirements”
   2. See Mechanical Divisions for cutting, patching or relocating mechanical items.
   3. See Electrical Divisions for cutting, patching or relocating electrical items.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner’s property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner’s property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner’s designated storage area.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled or otherwise indicated to remain the Owner’s property, demolished materials shall become the Contractor’s property and shall be removed from the site with further disposition at the Contractor’s option.

1.5 SUBMITTALS

A. General: Submit each item in this article according to the Conditions of the Contract and Specification Sections, for information only, unless otherwise indicated.

B. Schedule of selective demolition activities indicating the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
   2. Interruption of utility service.
   3. Coordination for shut-off, capping, and continuation of utility services.

C. Inventory of items to be removed and salvaged.

D. Inventory of items to be removed by Owner.

E. Record drawings at project closeout according to Division 01 “General Project Requirements”.

1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

F. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition work similar to that indicated for this project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Predemolition Conference: Conduct conference at project site to comply with preinstallation conference requirements of Division 01.

1.7 PROJECT CONDITIONS

A. Owner assumes no responsibility for actual condition of materials to be selectively demolished.

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

B. Storage or sale of removed items on site will not be permitted.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

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

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

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

E. Survey the condition of the materials to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

F. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving area of the building to be selectively site demolished.

1. Arrange to shut off indicated utilities with the Building Owner.
2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connection to maintain continuity of service to other parts of the building before proceeding with selective demolition.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.

C. Utility Requirements: Refer to Division 23 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PREPARATION

A. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
   1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
   2. Protect existing site improvements, appurtenances, and landscaping to remain.
   3. Provide temporary weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structure or interior areas.
   4. Protect walls, ceiling, floors, and other existing finish work that are indicated to remain and are exposed during selective demolition operations.
   5. Cover and protect furniture, furnishings, and equipment that have not been removed.

3.4 POLLUTION CONTROLS

A. Remove and transport debris using routes to be designated by the Building Owner, and in a manner that will prevent spillage on adjacent surfaces and areas.

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

3.5 SLECTIVE SITE DEMOLITION

A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
   1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
   2. Cut or Drill from the exposed or finished side in to concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain adequate ventilation when using cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, roofs, or framing.
7. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
8. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-drive masonry saw, power hammers or hand tools.

C. Break-up and remove concrete slabs on grade, unless otherwise shown to remain.

3.6 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

B. Patching is specified in Division 01 Section “General Project Requirements”.

C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer’s printed recommendations.

D. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Do not burn materials.

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

3.8 CLEANING

A. Sweep the area broom clean on completion of selective site demolition operation.

END OF SECTION 02 4113

SELECTIVE STRUCTURE DEMOLITION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

B. Related Work Specified elsewhere:

1. Division 01 Section “Cutting and Patching” for cutting and patching procedures for selective demolition.
2. Division 01 Section “Temporary Facilities and Controls” for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures for selective demolition operations.
3. Division 01 Section “Closeout Procedures” for record document requirements.
4. Division 06 Section “Rough Carpentry” for material and construction requirements for temporary enclosures.
5. See Mechanical Divisions for cutting, patching or relocating mechanical items.
6. See Electrical Divisions for cutting, patching or relocating electrical items.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of a building
2. Salvage of existing items to be reused or recycled.
3. Patching and repairs.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner’s property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner’s property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner’s designated storage area.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled or otherwise indicated to remain the Owner’s property, demolished materials shall become the Contractor’s property and shall be removed from the site with further disposition at the Contractor’s option.

1.5 SUBMITTALS

A. General: Submit each item in this article according to the Conditions of the Contract and Division 01 Specification Sections, for information only, unless otherwise indicated.
B. Schedule of selective demolition activities indicating the following:
    1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
    2. Interruption of utility service.
    3. Coordination for shut-off, capping, and continuation of utility services.
C. Inventory of items to be removed and salvaged.
D. Inventory of items to be removed by Owner.
E. Record drawings at project closeout according to Division 01 “Closeout Procedures”.
    1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
F. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition work similar to that indicated for this project.
B. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
C. Pre-demolition Conference: Conduct conference at project site to comply with preinstallation conference requirements of Division 01 Specification Section “Project Management and Coordination”.

1.7 PROJECT CONDITIONS

A. Owner assumes no responsibility for actual condition of buildings to be selectively demolished.
    1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practical.
B. Asbestos: It is not expected that asbestos will be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Architect and Owner.
    1. Asbestos will be removed by the Owner before the re-starting of work in the affected areas.
C, Storage or sale of removed items on site will not be permitted.

PART 2 – PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.
    1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
    2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

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

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

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

E. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

F. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving area of the building to be selectively demolished.

1. Arrange to shut off indicated utilities with the Building Owner.
2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connection to maintain continuity of service to other parts of the building before proceeding with selective demolition.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.

C. Utility Requirements: Refer to Division 22 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

D. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of the Authority Having Jurisdiction.

3.3 PREPARATION

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.

1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
2. Protect existing site improvements, appurtenances, and landscaping to remain.

3. Provide temporary weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structure or interior areas.
4. Protect walls, ceiling, floors, and other existing finish work that are indicated to remain and are exposed during selective demolition operations.
5. Cover and protect furniture, furnishings, and equipment that have not been removed.

3.4 POLLUTION CONTROLS

A. Remove and transport debris using routes to be designated by the Building Owner, and in a manner that will prevent spillage on adjacent surfaces and areas.

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

3.5 SELECTIVE DEMOLITION

A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition work above each floor or tier before disturbing supporting members on lower levels.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or Drill from the exposed or finished side in to concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact and dust generation.
8. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, roofs, or framing.
9. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-drive masonry saw, power hammers or hand tools.

C. Saw-cut perimeter of area to be demolished, then break-up and remove concrete slabs on grade, unless otherwise shown to remain.
D. Before cutting precast concrete floor planks, install structural steel to support cut edges. Sawcut plank and remove cut portion in largest pieces possible.
E. Remove resilient floor coverings and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings".
F. Remove air-conditioning equipment without releasing refrigerants.
G. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
    1. Remove existing roof membrane, flashings, copings and roof accessories.
    2. Remove existing roofing system down to substrate.

3.6 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
B. Patching is specified in Division 01 Section "Cutting and Patching".
C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
    1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer's printed recommendations.
D. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
E. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance.
    1. Closely match texture and finish of existing adjacent surface.
    2. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
    3. Where patching smooth painted surfaces, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat.
    4. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    5. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.
F. Patch, repair, or re-hang existing ceiling as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
B. Burning: Do not burn materials.
C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.8 CLEANING

A. Sweep the building broom clean on completion of selective demolition operation.

B. Change filters on air-handling equipment on completion of selective demolition operations.

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

3.9 SELECTIVE DEMOLITION SCHEDULE

A. Existing Items or Construction to be Removed: As indicated on the Drawings

B. Existing Items to be Removed and Salvaged: As indicated on the Drawings

C. Existing Items to be Removed and Reinstalled: As indicated on the Drawings

D. Existing Items to Remain: As indicated on the Drawings.

END OF SECTION 02 4119

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY
- A. Section Includes:
  1. Reinforcing bars.
  2. Reinforcement accessories.
- B. Related Sections:
  1. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES
- A. American Concrete Institute:
  1. ACI 117 – Specifications for Tolerance for Concrete Construction
  2. ACI 301 - Specifications for Structural Concrete.
  3. ACI 315 – Details and Detaining of Concrete Reinforcement
  4. ACI 318 - Building Code Requirements for Structural Concrete.
  5. ACI SP-66 - ACI Detailing Manual.
- B. ASTM International:
  1. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- C. Concrete Reinforcing Steel Institute:
  1. CRSI - Manual of Standard Practice.
  2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS
- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel bending and cutting schedules, and supporting and spacing devices.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements
  1. Submit certified copies of mill test report of reinforcement materials analysis.

1.4 QUALITY ASSURANCE
- A. Perform Work in accordance with CRSI - Manual of Standard Practice.
- B. Prepare shop drawings in accordance with ACI SP-66.

1.5 COORDINATION
- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 - PRODUCTS

2.1 REINFORCEMENT
- A. Deformed Reinforcement: ASTM A615/A615M; 60 ksi yield strength, steel bars, unfinished.

2.2 ACCESSORY MATERIALS
- A. Tie Wire: Minimum 16 gage annealed type.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic tipped steel type; size and shape to meet Project conditions.

2.3 FABRICATION
- A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice.
- B. Form standard hooks for 180 degree bends, 90 degree bend, stirrup and tie hooks, as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.

D. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Architect/Engineer.

2.4 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Make completed reinforcement available for inspection at manufacturer's factory prior to packaging for shipment. Notify Architect/Engineer at least seven days before inspection is allowed.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.

1. Do not weld crossing reinforcement bars for assembly.

B. Do not displace or damage vapor retarder.

C. Accommodate placement of formed openings.

D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.

E. Maintain concrete cover around reinforcement in accordance with ACI 318.

F. Bond and ground reinforcement in accordance with requirements of Section 26 05 26

3.2 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements : Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed by Owner's testing laboratory in accordance with the IBC code.

C. Provide free access to Work and cooperate with appointed firm.

D. Reinforcement Inspection:

1. Placement Acceptance: Specified [and ACI 318] material requirements and specified placement tolerances.

2. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

END OF SECTION 03 2000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
1. Foundations
2. Foundation walls.
3. Slabs on grade.
4. Control, expansion and contraction joint devices.

B. Related Sections:
1. Section 03 20 00 - Concrete Reinforcing.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 117 – Specifications for Tolerance for Concrete Construction
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 305 - Hot Weather Concreting.
4. ACI 306.1 - Standard Specification for Cold Weather Concreting.
5. ACI 308.1 - Standard Specification for Curing Concrete.
6. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
3. ASTM C33 - Standard Specification for Concrete Aggregates.
4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
5. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
6. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
7. ASTM C150 - Standard Specification for Portland Cement.
8. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
9. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
13. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
14. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
15. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
16. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
17. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
18. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
19. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
20. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

21. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
22. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 PERFORMANCE REQUIREMENTS
- A. Vapor Retarder Permeance: Maximum 0.3 perms when tested in accordance with ASTM E96, Procedure A.

1.4 SUBMITTALS
- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on aggregate, cementitious material, admixtures, curing compounds, vapor retarders, joint devices, attachment accessories, and slab joint fillers.
- C. Design Data:
  1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
     a. Hot and cold weather concrete work.
     b. Air entrained concrete work.
  2. Identify mix ingredients and proportions, including admixtures.
  3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.
- D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.5 CLOSEOUT SUBMITTALS
- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.6 QUALITY ASSURANCE
- A. Perform Work in accordance with ACI 301.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.

1.7 ENVIRONMENTAL REQUIREMENTS
- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.8 COORDINATION
- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 – PRODUCTS

2.1 CONCRETE MATERIALS
- A. Cement: ASTM C150, Type I - Normal Portland
- B. Normal Weight Aggregates: ASTM C33.
  1. Coarse Aggregate Maximum Size: In accordance with ACI 318.
- C. Water: ACI 318; potable.

2.2 ADMIXTURES
- A. Air Entrainment: ASTM C260.
- B. Chemical: ASTM C494/C494M Type A - Water Reducing, Type D - Water Reducing and Retarding, Type F - Water Reducing, High Range, Type G - Water Reducing, High Range and Retarding.
- C. Fly Ash: ASTM C618 Class C or F.

D. Plasticizing: ASTM C1017/C1017M Type I, plasticizing or Type II, plasticizing and retarding.

2.3 ACCESSORIES

A. Bonding Agent: Two component modified epoxy resin.

B. Vapor Retarder: ASTM E1745 Class C; or 10mil polyethylene film type recommended for below grade application. Furnish joint tape recommended by manufacturer.

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler ASTM D994; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile.

2.5 CONCRETE MIX

A. Select proportions for concrete in accordance with ACI 318 trial mixtures or field experience.

B. Provide concrete to the following criteria meeting the specifications stated in the structural construction documents.

C. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect/Engineer.

1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.
2. Do not use calcium chloride nor admixtures containing calcium chloride.
3. Use set retarding admixtures during hot weather.
4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing or deicing chemicals.

D. Average Compressive Strength Reduction: Permitted in accordance with ACI 318.

E. Ready Mixed Concrete: Mix and deliver concrete in accordance with [ASTM C94/C94M] [ASTM C685/C685M].

PART 3 – EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

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

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

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

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

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify testing laboratory minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.

E. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

F. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

G. Set top to required elevations. Secure to resist movement by wet concrete.

H. Deposit concrete at final position. Prevent segregation of mix.

I. Place concrete in continuous operation for each panel or section determined by predetermined joints.
J. Consolidate concrete.
K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
L. Place concrete continuously between predetermined expansion, control, and construction joints.
M. Do not permit unanticipated cold joints to occur.
N. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/4 depth of slab thickness.
O. Screed slabs on grade level, maintaining surface flatness of Ff of 30 and surface levelness of Fl of 25 unless noted otherwise.

3.4 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed smooth rubbed finish.
B. Finish concrete floor surfaces in accordance with ACI 301.
C. Wood float surfaces receiving quarry tile, ceramic tile, terrazzo or other areas requiring full bed setting system.
D. Steel trowel surfaces receiving ,carpeting, resilient flooring, seamless flooring, thin set quarry tile, or thin set ceramic tile.
E. Steel trowel surfaces which are indicated to be exposed.
F. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
C. Cure floor surfaces in accordance with ACI 301.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
B. Field inspection and testing will be performed by Owner’s testing laboratory in accordance with IBC code.
C. Provide free access to Work and cooperate with appointed firm.
D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
E. Concrete Inspections:
    1. Continuous Placement Inspection: Inspect for proper installation procedures.
    2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
F. Strength Test Samples:
    1. Sampling Procedures: ASTM C172.
    2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
    3. Sample concrete and make one set of four cylinders for every 150 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
    4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
    5. Make one additional cylinder during cold weather concreting, and field cure.
G. Field Testing:
    1. Slump Test Method: ASTM C143/C143M.

2. Air Content Test Method: ASTM C231.
3. Temperature Test Method: ASTM C1064/C1064M.
4. Measure slump and temperature for each compressive strength concrete sample.
5. Measure air content in air entrained concrete for each compressive strength concrete sample.

H. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39.
2. Test Acceptance: In accordance with ACI 318.
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Retain one cylinder for 56 days for testing when requested by Architect/Engineer.
6. Dispose remaining cylinders when testing is not required.

I. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.7 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections as directed by Architect/Engineer.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION 03 3000

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PLANT-PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY
- A. Section includes mortar [and grout] for masonry.
- B. Related Sections:
  1. Section 05 12 00 – Structural Steel Framing

1.2 REFERENCES
- A. ASTM International:
  1. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
  2. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
  3. ASTM C150 - Standard Specification for Portland Cement.
  4. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
  5. ASTM C476 - Standard Specification for Grout for Masonry.
  6. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.
- B. The Masonry Society:
  1. TMS MSJC - Building Code for Masonry Structures (ACI 530/ASCE 5/TMS 402), Specification for Masonry Structures (ACI 530.1/ASCE 6/TMS 602) and Commentaries.

1.3 SUBMITTALS
- A. Section 01 33 00 - Submittal Procedures Submittal requirements.
- B. Test Reports:
  1. Submit reports on grout indicating conformance of grout to property requirements of ASTM C476.
- C. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE
- A. Perform Work in accordance with TMS MSJC Code and TMS MSJC Specification.

1.5 ENVIRONMENTAL REQUIREMENTS
- A. Hot and Cold Weather Requirements: TMS MSJC Specification.

PART 2 - PRODUCTS

2.1 MORTAR AND MASONRY GROUT
- A. Furnish materials in accordance with Municipality standards.

2.2 COMPONENTS
- A. Portland Cement: ASTM C150, Type I.
- B. Grout Aggregate: ASTM C404, fine and coarse.
- C. Water: Clean and potable.

2.3 MIXES
- A. Grout Mixes:
  1. Grout for Structural Masonry: 2,000psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476 Coarse grout.
  2. Application:
     a. Coarse Grout: For grouting spaces with minimum 4 inches (100 mm) dimension in every direction.
- B. Grout Mixing:
  1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
  2. Add admixtures; mix uniformly.

PART 3 – EXECUTION

3.1 EXAMINATION
- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Request inspection of spaces to be grouted.

3.2 INSTALLATION
- A. Install mortar and grout in accordance with TMS MSJC Specification.

3.3 FIELD QUALITY CONTROL
- A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Testing of Grout Mix: In accordance with ASTM C1019 for compressive strength, and in accordance with ASTM C143/C143M for slump.

END OF SECTION 04 0503

CAST STONE MASONRY

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Procurement and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This section includes:
1. (2) South Entry Piers: 4 sides and removable top
2. (2) Precast sills at Gymnasium (to replace glazed block sills)

B. Related Sections:
1. Division 07 Section “Joint Sealants” for sealing joints in cast stone and sealing to adjacent materials.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
1. For cast tone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Verification:
1. For color and texture of cast stone required, 10 inches square in size; color to match existing on south side of existing building..

D. Full-Size Samples: For each color and texture of cast stone unit required.
1. Make available for Architect’s review at Project site or at manufacturing plant, if acceptable to Architect.
2. Make Samples from materials to be used for units used on Project immediately before beginning production of units for Project.
3. Approved Samples may be installed in the Work.

E. Qualification Data: For manufacturer.
1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.

F. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.
1. Provide test reports based on testing within previous to years.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units. Manufacturer to have a minimum of 5 years experience in producing cast stone.

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.

D. Mockups: Furnish cast stone for installation in mockups.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery of cast stone to avoid delaying the Work and to minimize the need for on-site storage.

B. Pack, handle, and ship cast stone units in suitable packs or pallets.

1. Lift with wide-belt slings: do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.6 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.

PART 2 - PRODUCTS:

2.1 CAST STONE UNITS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Advanced Cast Stone, Inc.
2. Artstone.
3. Continental Cast Stone.
4. Custom Cast Stone.
5. Edward Cast Stone.
6. MarcStone – Hampton, MN.
7. Stoneworks.
8. Thunderstone LLC – Lincoln, NE

B. Provide cast stone units complying with ASTM C 1364 using either the vibrant dry tamp or wet-cast method.

1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.
2. Compressive Strength, Absorption, Cold Water and Linear Shrinkage: ASTM C 1364.

C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.

D. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.

2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

E. Cure units as follows:
1. Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

G. Colors and Textures: To match existing precast sills and banding on 2011 Courthouse Addition.

2.2 MORTAR MATERIALS

A. Provide mortar materials that comply with Division 04 Section “Brick Masonry”.

2.3 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

B. Dowels: 1/2 inch diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

C. Sealants: As specified in Section 07 9000 “Joint Sealants”.

2.4 MORTAR MIXES

A. Comply with requirements in Division 04 Section “Brick Masonry” for mortar mixes.

2.5 SOURCE QUALITY CONTROL

A. Engage a qualified independent testing agency to sample and test cast stone units according to ASTM C 1364.
1. Include one test for resistance to freezing and thawing.

PART 3 - EXECUTION:

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

A. Install cast stone units to comply with requirements in Division 04 Section “Brick Masonry”.

3.3 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

A. Set cast stone as indicated on Drawings and to comply with requirements in Division 04 Section “Brick Masonry”. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.

B. Fill anchor holes with sealant.
1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.

C. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.

D. Install mortar in joints, and rake joints to accept sealant at face of joint. Keep shims and spacers intact in joints after anchors and supports are secured in place and cast stone units are anchored.
   1. Form open joint of width indicated, but not less than 3/8 inch.

E. Prime cast stone surfaces which receive sealant, before applying sealant in joints, unless otherwise indicated.

F. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Division 07 Section “Joint Sealants” and that is compatible with specified sealer.

3.4 SETTING TOLERANCES

A. Tolerances: Comply with Cast Stone Institute Standard Specification.
   1. Variation from Plumb: Do not exceed 1/8 inch in 5 feet or 1/4 inch in 20 feet or more.
   2. Variation from Level: Do not exceed 1/8 inch in 5 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.
   3. Variation in Joint Width: Do not vary joint width more than 1/8 inch or 1/4 of nominal joint width, whichever is greater.
   4. Variation in Plane Between Adjacent Surfaces: Do not exceed 1/8 inch difference between planes of adjacent components or adjacent surfaces indicated to be flush with components.

3.5 REPAIR

A. Surface Repair:
   1. Repair chipping and other surface damage noticeable when viewed in direct daylight at 20 feet.
   2. Repair with matching touch-up material provided by manufacturer and in accordance with manufacturer’s instructions.
   3. Repair methods and results to be approved by Architect.

3.6 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. Apply penetrating sealer on cast stone at below-grade locations to approximately 1” above finish grade before any soils are backfilled up against cast stone.

D. Protect all surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

E. Wet surfaces before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

F. Clean cast stone per manufacturer’s recommendations.

END OF SECTION 04 7200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural shapes.
2. Channels and angles.
3. Hollow structural sections.
4. Structural pipe.
5. Structural plates and bars.
6. Fasteners, connectors, and anchors.
7. Grout.

B. Related Sections:
1. Section 05 31 13 - Steel Floor Decking: Support framing for small openings in floor deck.
2. Section 05 31 23 - Steel Roof Decking: Support framing for small openings in roof deck.
3. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.2 REFERENCES

A. American Institute of Steel Construction:
1. AISC Code of Standard Practice for Steel Buildings and Bridges.
2. AISC Specification for Allowable Stress Design of Single-Angle Members.
3. AISC Specification for the Design of Steel Hollow Structural Sections.
4. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.

B. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
4. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
5. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
6. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
7. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
8. ASTM E94 - Standard Guide for Radiographic Examination.
9. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
10. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
11. ASTM E709 - Standard Guide for Magnetic Particle Examination.
12. ASTM F436 - Standard Specification for Hardened Steel Washers.
13. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.

D. Research Council on Structural Connections:
   1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
E. SSPC: The Society for Protective Coatings:
   1. SSPC - Steel Structures Painting Manual.
   2. SSPC SP 3 - Power Tool Cleaning.

1.3 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections not detailed.
   3. Cambers.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
D. Manufacturer's Mill Certificate: Certify products that meet or exceed specified requirements.
E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.4 QUALITY ASSURANCE
A. Perform Work in accordance with the following:
   1. AISC Code of Standard Practice for Steel Buildings and Bridges.
   2. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
   3. AISC Specification for the Design of Steel Hollow Structural Sections.
   4. AISC Specification for Allowable Stress Design of Single-Angle Members.
   5. RCSC Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

1.5 QUALIFICATIONS
A. Fabricator: AISC certified fabricator specializing in performing the Work of this section with minimum three years documented experience.
B. Erector: Company specializing in performing Work of this section with a minimum of three years' experience.
C. Shop Painter: Company specializing in performing Work of this section with minimum three years documented experience.
D. Welders and Welding Procedures: AWS D.1 qualified within the previous 12 months.

1.6 COORDINATION
A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
B. Coordinate work with the following:
   1. Section 05 31 13, 05 31 23, for framed openings other than structural steel.
   2. Section 05 50 00 for miscellaneous steel supports other than structural steel.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL
A. Structural W-Shapes: ASTM A992/A992M.
B. Channels and Angles: ASTM A36/A36M.
C. Round Hollow Structural Sections: ASTM A500, Grade B.
D. Square and Rectangular Hollow Structural Sections: ASTM A500, Grade B.
E. Structural Pipe: ASTM A53/A53M, Grade B.
F. Structural Plates and Bars: ASTM A36/A36M.

2.2 FASTENERS, CONNECTORS, AND ANCHORS
A. Bolts: ASTM A307; Grade A or B.

1. Finish: Unfinished.

B. High Strength Bolts: ASTM A325; Type 1.
   1. Finish: Unfinished.

C. Nuts: ASTM A563 heavy hex type.
   1. Finish: Unfinished.

D. Washers: ASTM F436; Type 1, circular with clipped washers where space limitations require.
   1. Finish: Unfinished.

E. Anchor Rods: ASTM F1554; Grade 36.
   1. Shape: Straight.
   2. Plate Washers: ASTM A36/A36M.

2.3 WELDING MATERIALS

A. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 ACCESSORIES

A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.

B. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.

2.5 FABRICATION

A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

B. Fabricate connections for bolt, nut, and washer connectors.

C. Develop required camber for members.

2.6 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 3.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or at high strength bolted locations.

2.7 SOURCE QUALITY CONTROL AND TESTS

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Shop test bolted and welded connections as specified for field quality control tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify bearing surfaces are at correct elevation.

C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

A. Furnish templates for installation of anchor rods and embedment’s in concrete and masonry work.

3.3 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

B. Field weld components indicated on Drawings and shown in shop drawings.

C. Field connect members with threaded fasteners; torque to required resistance tighten to snug tight for bearing type connections.

D. Do not field cut or alter structural members without approval of Architect/Engineer.

E. After erection, touch up the welds and abrasions to match shop finishes.

3.4 GROUT INSTALLATION

A. Shim bearing plates and equipment supports to proper elevation, snug tighten anchor bolts.

B. Fill void under bearing surface with grout. Install and pack grout to remove air pockets.
C. Moist cure grout.
D. Remove forms after grout is set. Trim grout edges to from smooth surface, splayed 45 degrees.
E. Tighten anchor bolts after grout has cured for a minimum of 3 days.

3.5 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.
B. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
C. Maximum Offset from Alignment: 1/4 inch.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
B. Bolted Connections: Inspect in accordance with AISC specifications.
   1. Visually inspect all bolted connections.
   2. For Direct Tension Indicators, comply with requirements of ASTM F959. Verify that gaps are less than gaps specified in Table 2.
C. Welding:
   1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
   2. Visually inspect all welds.
   3. Ultrasonic Inspection: ASTM E164; perform on all full penetration welds.
   4. Liquid Penetrant Inspection: ASTM E165.
D. Correct defective bolted connections and welds.

END OF SECTION 05 1200

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY
- A. This section includes:
  - 1. Steel framing and supports for countertops
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections
  - 4. Miscellaneous fabrications as required.
  - 11. Loose bearing and leveling plates for applications where they are not specified in other Sections

1.3 SUBMITTALS
- A. Shop Drawings: Required.
  - 1. Show fabrication and installation details for metal fabrications.
  - 2. Include plans, elevations, sections and details of metal fabrications and their connections. Show anchorage and accessory items.

1.4 QUALITY ASSURANCE
- A. Codes and Standards:
  - 1. AISC, AWS.
  - 2. AA – Aluminum Association.
  - 3. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 4. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 5. OSHA 1910.27 – Fixed Ladders.
- B. Testing: Not required.
- C. Guarantee: Per contract conditions.

1.5 PRODUCT DELIVERY STORAGE AND HANDLING
- A. Deliver Materials: to the job site in good condition and properly protected against damage to finished surfaces.
- B. Storage on Site:
  - 1. Store material in a location and in a manner to avoid damage. Stack in a way to prevent bending.
  - 2. Store in a clean, dry location, away from uncured concrete and masonry. Cover with a waterproof paper, or tarpaulin to permit circulation of air.
- C. Keep handling to a minimum.

PART 2 PRODUCTS:

2.1 MATERIALS:
- A. Steel Plates, Shapes, Bars to be ASTM A36 steel unless otherwise noted on drawings.

B. Steel Tubing- ASTM A 500, cold-formed steel tubing.
C. Galvanized steel – ASTM A446-69 and latest standards of American Hot Galvanizers Association.
D. Bolts – ASTM A307, latest edition.
E. Anchor bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; where indicated, flat washers.
   1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
F. Paint – Federal Specification TT-P86a, Type II, or approved equal, color as selected by Architect.
   1. Coordinate painting with galvanized metal.
G. Welding electrodes – ASTM A223E 70xx.
H. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
I. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

2.2 FABRICATION:
A. Fabricate all items in accordance with the drawings and specifications and approved shop drawings.
B. Shop Assembly: Preassemble items in the shop to the greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
C. Cut, drill and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
E. Form exposed work with accurate angles and surfaces and straight edges.
F. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

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

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

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

K. All metal shall be thoroughly cleaned; all rust and scale removed, and shall receive one shop coat of primer.

2.3 MISCELLANEOUS STEEL TRIM

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

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

C. Prime miscellaneous steel trim with primer specified in Division 09 Section “Painting” or with Sherwin Williams Shopcoat Primer CC-A101.

2.5 LOOSE BEARING AND LEVELING PLATES

A. Provide loosed bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Prime plates with primer specified in Division 09 Section “Painting” or with Sherwin Williams Shopcoat Primer CC-A101.

2.6 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for reach opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loosed lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in exterior walls with primer specified in Division 09 Section “Painting” or with Sherwin Williams Shopcoat Primer CC-A101.

2.4 STEEL WELD PLATES AND ANGLES

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

2.5 FINISHES, GENERAL:

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.6 STEEL and IRON FINISHES:

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

1. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not to be galvanized unless they are to be embedded in concrete, or masonry or unless otherwise indicated.
   1. Sherwin Williams Shopcoat Primer CC-A101 is an acceptable primer for those items not specified as hot-dip galvanized.

PART 3 EXECUTION:

3.1 Installation, General:

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

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

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

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

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

3.2 Adjusting and Cleaning

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

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

C. Return all handrails to walls.

END OF SECTION 05 5000

METAL EGRESS GATES

PART 1 - GENERAL

1.1 SUMMARY
- A. Section Includes:
  - 1. Prefabricated egress gates for stairwells.
- B. Related Sections:
  - 1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES
- A. American Welding Society (AWS) D1.1/D1.1M - Structural Welding Code - Steel.
- B. ASTM International (ASTM):
  - 1. A36/A36M - Standard Specification for Carbon Structural Steel.
  - 2. E2072 - Standard Specification for Photoluminescent (Phosphorescent) Safety Markings.
- C. International Code Council (ICC):
  - 1. International Building Code (IBC).
  - 2. International Fire Code (IFC).
- D. National Fire Protection Association (NFPA) 101 - Life Safety Code.
- E. Underwriters Laboratories, Inc. (UL) 1994 - Standard for Luminous Egress Path Marking Systems.
- F. United States Department of Justice (USDOJ) - ADA Standards for Accessible Design (SAD).

1.3 SUBMITTALS
- A. Action Submittals:
  - 1. Product Data: Manufacturer's descriptive data including dimensions, materials, finishes, and mounting details.
- B. Informational Submittals:
  - 1. Certificates of Compliance: Show product compliance with reference standards.
- C. Closeout Submittals:
  - 1. Maintenance Data: Include recommendations for sign cleaning and routine maintenance.

1.4 QUALITY ASSURANCE
- A. Installer Qualifications: Minimum 2 years experience in work of this Section.
- B. Provide "No Exit" signs in accordance with Minnesota Building Codes

1.5 DELIVERY, STORAGE AND HANDLING
- A. Store signs in cool, dry location in original packaging until installed.
- B. Store gates above ground on platforms, skids, or other supports; separate with wooden separators.
- C. Protect steel from corrosion.
- D. Prevent damage to prime coat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
- A. Contract Documents are based on products by EgressGate www.eggressgate.com.
- B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS
- A. Steel Shapes, Tube, Pipe, and Plate: ASTM A36/A36M.
- B. Hinges: Self-closing type, single acting, of sufficient spring power to completely close gate without excessive noise upon impacting strike plate.

C. Photoluminescent Sign Luminance Properties: ASTM E2072 and UL 1994.
1. From test sample activation: 10.76 lx (1.000 fc) for 60.0 minutes:
a. For 10 minutes after lights go out: Minimum 30 mcd per square meter.
b. For 60 minutes after lights go out: Minimum 7 mcd per square meter.
c. For 90 minutes after light go out: Minimum 5 mcd per square meter.

2.3 MANUFACTURED UNITS
A. Metal Egress Gates:
1. Comply with requirements of IBC and NFPA 101.
2. Provide barrier in stairwells to prevent accidental travel beyond designated exit level.
3. 90 to 180 degree opening.
4. Self-closing and self-stopping.
5. Reversible swing direction.
6. Universal mounting.
7. Width: Adjustable to fit openings from 40 to 60 inches.
8. For wide openings or to avoid obstructions, utilize two egress gates for a double swing gate.
9. Height: 32 inches.

B. “No Exit” Signs:
1. Description: Non-flexible photoluminescent sign with tactile raised numbers and Braille markings.
2. Listed to UL 1994.
3. Size: 12 x 9 inches.
4. Conform to 2020 Minnesota Accessibility Code for sign design and content.

2.4 FABRICATION
A. Shop assemble gates, ready for delivery to site.
B. Fabricate with joints tightly fitted and secured.
C. Welding to conform to AWS D1.1/D1.1M. Grind exposed welds smooth.
D. Ease exposed edges to small uniform radius.
E. Equip each gate with:
1. Universal mounting.
2. Two hinges.
3. Steel stop plate welded to gate, with slotted bolt holes for adjustment.
4. Steel sign plate with photoluminescent “No Exit” sign welded to gate.

2.5 FINISHES
A. Ferrous Metal: Shop painted with one coat red oxide primer paint.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Install gates in accordance with manufacturer’s instructions.
B. Weld anchor plates to mounting bars if required based on adjacent construction.
C. Weld stop plate to gates.
D. Extend gates to required width, then weld expansion joints on top and bottom tubes.
E. Welding to conform to AWS D1.1/D1.1M. Grind welds smooth.

3.2 ADJUSTING
A. Clean and touch up damaged primer paint with same product as applied in shop.

END OF SECTION 05 5216

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Fire retardant treated blocking in stud walls for device and accessory anchoring as required or indicated on plans.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 06 Section “Interior Architectural Woodwork” for laminate casework & countertops

1.3 DEFINITIONS

A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.4. SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data for the following products:
   1. Metal framing anchors.

C. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.

D. Wood treatment data as follows including chemical treatment manufacturer’s instructions of handling, storing, installation, and finishing of treated material:
   1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
   2. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.
   3. Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.
   4. Warranty of chemical treatment manufacturer for each type of treatment.

E. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction evidencing compliance of the following wood products with specified requirements and building code in effect for Project.
   1. Metal framing anchors.
   2. Power driven fasteners.

1.5 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer’s instructions, site conditions, or applicable codes and standards; request clarification from the Architect before

proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Testing Laboratory Qualifications: To qualify for acceptance, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying the progress of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

PART 2 - PRODUCTS:

2.1 LUMBER, GENERAL

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:
RIS – Redwood Inspection Service.
NLGA – National Lumber Grades Authority (Canadian).
SPIB – Southern Pine Inspection Bureau.
WCLIB – West Coast Lumber Inspection Bureau.
WWPA – Western Wood Products Association.

C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
1. For exposed lumber furnish pieces with grade applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.2 DIMENSION LUMBER

A. General Dimension Lumber Notes:
1. Lumber: PS 20; graded in accordance with established Grading rules; maximum moisture content of 19 percent.
2. Governing Code: National Design Specifications for Wood Construction.
3. All members sizes given are nominal sizes.
4. All lumber shall be straight and free from defects.
5. All lumber in contact with concrete or soil is to be treated with preservatives.

B. Blocking, Nailers and Miscellaneous Framing Lumber:
   1. "Construction" grade, douglas fir-larch, douglas fir-south, hem-fir and mountain hemlock.

C. Grounds, Stripping, Furring, Boards:
   1. No. 2 common, any species allowed.

2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPA rules or "no. 2 Boards" per SPIB rules.

2.4 CONSTRUCTION PANELS, GENERAL:

A. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.

B. Trademark: Furnish construction panels that are each factory-marked with APA trademark evidencing compliance with grade requirements.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacturer.
   1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating ASTM A 153 or AISI Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power Driven Fasteners: National Evaluation Report NER-272.

D. Wood Screws: ANSI B18.6.61.

E. Lag Bolts: ANSI B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

G. Mechanical Fasteners: Mechanical fasteners shall be self-drilling, self-tapping fasteners, "Teks" as manufactured by Buildex Division, Illinois Tool Works, Inc. or approved equal, Fasteners shall be selected for each type of lumber and plywood fastening condition in accordance with manufacturer's recommendations.

2.6 ROUGH HARDWARE AND METAL FRAMING ANCHORS

A. General: Furnish and install rough hardware including nails, screws, bolts, cinch anchors, toggle bolts, framing anchors, and similar items. Rough hardware shall be of the proper size, type and strength for the use intended and for the material to be fastened. Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
   1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having

jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.

2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

B. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G60 and with ASTM A;446, Grade A (structural quality); ASTM A 526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.

1. Use galvanized steel framing anchors for all rough carpentry.

C. Anchor Bolts: Furnish anchor bolts indicated on the contract drawings or otherwise required to attach wood plates and bucks to masonry and concrete. Bolts shall be 1/2" diameter unless noted otherwise, threaded one end with 1-1/2" right angle bend opposite end. Unless noted otherwise on the drawings, bolts shall extend not less than 6" into concrete and horizontal masonry surfaces and not less than 16" vertical into masonry. Deliver anchor bolts to the site promptly to be built in as work progresses.

2.7 FIRE-RETARDANT TREATED MATERIALS:

A. General: Comply with performance requirements in AWPA C20 (lumber).

1. Use treatment that does not promote corrosion of metal fasteners.
2. Use Exterior type for exterior locations and where indicated.
3. Use Interior type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
4. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

1. Concealed blocking
2. Plywood backing panels

PART 3 - EXECUTION:

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be

exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screening or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

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

END OF SECTION 06 1000

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06 2000 – FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section includes the following:
   1. Miscellaneous finish carpentry items as indicated and required.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 6 Section “Rough Carpentry” for furring, blocking, and other carpentry work that is not exposed to view.
   2. Division 6 Section “Interior Architectural Woodwork” for interior trim, rails, casework, countertops and paneling.
   3. Division 7 Section “Joint Sealants” for sealants.
   4 Division 8 Section “ Finish Hardware” for Door Hardware.
   5. Division 9 Section “Painting” for back priming and finishing of finish carpentry.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 0I Specification Sections.

B. Product data for each item of factory=fabricated product and process specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.

C. Wood treatment data as follows including chemical treatment manufacturer’s instructions for hand ling, storage, installation and finishing treated materials.
   1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
   2. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to Project site.

D. Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

E. Warranty of chemical treatment manufacturer for each type of treatment.

F. Samples for initial selection purposes of the following in form of manufacturer’s color charts consisting of actual units or sections for units showing full range of colors, textures, and patterns available for each type of material indicated.
   1. Each type of paneling specified.
   2. Cement Composite shingles.

G. Samples for verification purposes of the following:

   1. Lumber and panel products for non-factory-applied finish, 50 square inches for lumber and 8-1/2 inches by 11 inches for panels for each species and cut, finished on one side and one edge, with one-half of exposed surface finished.
   2. Full size cement composite shingle.

1.4. QUALITY ASSURANCE / ACCEPTABLE CONTRACTORS

A. Installer Qualifications: Arrange for installation of finish carpentry by a firm that can demonstrate successful experience in installing finish carpentry items similar in type and quality to those required for this Project.

B. Finish Carpentry Contractors: Work must be performed by a firm having not less than 5 years successful experience in comparable Interior and Exterior Finish Carpentry projects and employing skilled personnel each having not less than 3 years experience in the Interior and Exterior Finish Carpentry processes and operations indicated for this project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

B. Do not deliver interior finish carpentry until environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified for installation areas.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Obtain and comply with finish carpentry manufacturer's and installer's coordinated advice for optimum temperature and humidity conditions for finish carpentry during its storage and installation.

B. Weather Conditions: Proceed with finish carpentry only when existing and forecasted weather conditions will permit exterior finish carpentry to be installed in compliance with manufacturer's recommendations and when substrate is completely dry.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber Standards: Comply with PS 20 "American Softwood Lumber Standard" for lumber and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.

B. Plywood Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for ply wood and, for products not manufactured under PS 1, with APA PRP-108.

C. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:
   1. RIS – Redwood Inspection Service
   2. SPIB – Southern Pine Inspection Bureau
   3. WCLIB – West Coast Lumber Inspection Bureau
   4. WWPA – Western Wood Products Association

D. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

   1. For exposed lumber furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

E. Formaldehyde Emission Levels: Comply with formaldehyde emission requirements of each voluntary standard referenced below:
   1. Particleboard: NPA 8
   2. Medium-Density Fiberboard: NPA 9
   3. Hardwood Plywood: HPMA FE

2.5 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Stainless steel, noncorrosive aluminum or hot-dip galvanized nails, in sufficient length to penetrate minimum 1-1/2 inches into substrate unless recommended otherwise by manufacturer.
   1. Countersink nails and fill surface where face nailing is unavoidable.
   2. Nails for Cement Composite Shingles: Stainless steel ring shank shingle nails, sized to penetrate wall sheathing."

B. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
   1. Countersink nails, fill surface flush, and sand where face nailing is unavoidable.

D. Adhesives: Comply with manufacturer's recommendations for adhesives.

E. Flashing: Comply with requirements of Division 7 Section "Flashing and Sheet Metal" for flashing materials installed in finish carpentry.

F. Sealants: Comply with requirements of Division 7 Section "Joint Sealants" for materials required for sealing siding work.

2.6 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS

A. General: Where lumber or plywood is indicated as preservative-treated wood or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the AWPB or SPIB Quality Mark Requirements.

B. Pressure-treat above-ground items with water-borne preservatives to a minimum retention of .25 pcf. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent.

C. Pressure-treat wood members in contact with the ground or fresh water with water-borne preservatives to a minimum retention of 0.40 pcf.

D. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

E. Extent of Treatment: As indicated.

2.7 FABRICATION

A. Wood Moisture Content: Comply with requirements of specified inspection agencies and manufacturer's recommendations for moisture content of finish carpentry in relation to relative humidity conditions existing during time of fabrication and in installation areas. Provide finish carpentry with moisture content that is compatible with Project requirements.

B. Fabricate finish carpentry to dimensions, profiles and details indicated. Ease edges to radius indicated for the following:
   1. Lumber less than 1 inch in nominal thickness: 1/16 inch.
   2. Lumber 1 inch or more in nominal thickness: 1/8 inch.

C. Wood members which exceed 6 inches in width may be fabricated from multiple pieces in accordance with AWI standards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Condition finish carpentry to average prevailing humidity conditions in installation areas before installation for a minimum of 24 hours unless longer conditioning recommended by manufacturer.

C. Backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Section ”Painting.”

3.3 INSTALLATION, GENERAL

A. Do not use finish carpentry materials that are unsound, warped, bowed, twisted, improperly treated or finished, not adequately seasoned or too small to fabricate with proper jointing arrangements.

B. Do not use manufactured units with defective surfaces, sizes, or patterns.

C. Install finish carpentry plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.

D. Scribe and cut carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

E. Install to tolerance of 1/8 inch in 8 feet for plumb and level. Install adjoining finish carpentry with 1/16 inch maximum offset for flush installation and 1/8 inch maximum offset for reveal installation.

F. Coordinate finish carpentry with materials and systems that may be in or adjacent to standing and running trim and rails. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rains.

G. Finish in accordance with specified requirements.

H. Refer to Division 9 Sections for final finishing of finish carpentry.

3.6 ADJUSTING

A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.

3.7 CLEANING

A. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.8 PROTECTION

A. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at time of Substantial Completion

.

END OF SECTION 06 2000

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:
   1. Wood and Plastic laminate cabinets (casework).
   2. Cabinet tops (countertops).
      a. Solid Surface Countertops
   3. Solid surface window sills at toilet rooms
   4. Solid surface transition strips/thresholds

B. Related Sections: The following sections contain requirements that relate to this section:
   1. Division 6 Section “Rough Carpentry” for furring, blocking, and other carpentry work that is not exposed to view.
   2. Division 8 Section “Flush Wood Doors” for doors specified by reference to architectural woodwork standards.
   3. Division 9 Section “Painting” for final finishing of installed architectural woodwork.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

C Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Wood casework and plastic laminate countertops; solid surface sills.

D. Samples for verification purposes of the following:
   1. Lumber with shop applied stained or transparent finish, 50 square inches, for each species and cut, finished on one side and one edge.
   2. Wood veneer faced panel products; with shop applied, stained or transparent finish, 8-1/2 inches by 11 inches, for each species and cut with one half of exposed surface finished, with separate samples of unfaced panel product used for core.
   3. Laminate clad panel products, 8-1/2 inches by 11 inches for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
   4. Corner pieces as follows:
      a. Cabinet front frame joints between stiles and rail as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
      b. Miter joints for standing trim.
   5. Exposed cabinet hardware, one unit of each type and finish.

E. Product certificates signed by woodwork manufacturer certifying that products comply with specified requirements.

F. Qualification data for firms and persons specified in “Quality Assurance” article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.4 QUALITY ASSURANCE / CONTROL OF INSTALLATION

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer’s instructions, site conditions, or applicable codes and standards; request clarification from the Architect before proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Manufacturer Qualifications: Firm experienced in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

C. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.

1. Include the veneering of wood doors in the single-firm production, where veneer matching extends across wood doors.

D. Installer Qualifications: Arranged for installation of architectural woodwork by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this project.

1. AWI Certified Manufacturer's: AWI Certification is not mandatory

E. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI) except as otherwise indicated.

F. All millwork must meet the Kitchen Cabinet Manufacturers Association (KCMA) ANSI/KCMA A161.1 standards.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Obtain and comply with Woodwork Manufacturer’s and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.

B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before

manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

1. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with manufacture of woodwork without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 08 Section “Door Hardware” to fabricator of architectural woodwork; coordinate shop drawings and fabrication with hardware requirements.

1.8 WARRANTY

A. Manufacturer’s Warranty: Provide manufacturer’s written warranty that installation shall be free of defects of materials and workmanship for a period of 5 years from Substantial Completion of the project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. High Pressure Decorative Laminate. Manufacturer: Subject to compliance with requirements, provide high pressure decorative laminates of one of the following:
   1. Formica – color as indicated.

B. Solid Surfacing Manufacturers.
   1. Corian, Dupont Polymers., colors as indicated.

2.2 MATERIALS

A. General: Provide materials that comply with requirements of the AWI woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, that apply to product characteristics indicated:
   1. Hardboard: ANSI/AHA A135.4
   2. High Pressure Laminate: NEMA LD 3.
   3. Medium Density Fiberboard: ANSI A208.2.
   4. Particleboard: ANSI A208.1
   5. Softwood Plywood: PS 1.

B. Formaldehyde Emission Levels: Comply with California ATCM 93120 (Airborne Toxic Control Measure) formaldehyde emission requirements and to of each standard referenced below:
   1. Particleboard: NPA 8.
   2. Medium Density Fiberboard: NPA 9.
   3. Hardwood Plywood

2.3 FABRICATION, GENERAL

A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.

B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Comers of cabinets and edges of solid wood (lumber) members less than 1 inch in nominal thickness: 1/16 inch.
   2. Edges of rails and similar members more than 1 inch in nominal thickness: 1/8 inch.

C. Complete fabrication, including assembly, finishing, and hardware application before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Factory-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges of cutouts with a water-resistant coating.

E. Laboratory Cabinets: fabricate with full-top plywood substrate.

2.4 PLASTIC LAMINATE CABINETS (CASE WORK) AND SHELVING

A. Quality Standard: Comply with AWI Section 400 and its Division 400B "Laminated Cabinets." Grade: Custom.

B. AWI Type of Cabinet Construction: Flush overlay.
   1. Laminate Cladding for Exposed Surfaces: High pressure decorative laminate (P-LAM 1) as follows:
      a. Formica: 8849-58 “Natural Teak” Matte Finish
         (1) As noted on Interior Finish Plans and Interior Elevations
      b. Grade: VGS (0.028-inch thickness).
   2. Edge Treatment: Same as laminate cladding on vertical surfaces
   3. Balancing Sheet: High Pressure Decorative Laminate, Grade BKL.

C. Grain/Pattern Matching: Run and match plastic laminate vertically for drawer fronts, doors, and fixed panels.

D. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers except where located directly under tops.

2.6 SOLID SURFACING MATERIAL:

A. Solid Surfacing Material: Homogeneous solid sheets of filler plastic resin complying with the material and performance requirements of ANSI Z 12F.3, Type 5 or 6, without precoated finish. Product as noted on Interior Elevations and details;

B. Colors, Patterns and Finishes: Provide materials and products that result in colors of sold surface material complying with the following requirements:
   1. Solid Surface Material for countertops and window wills (SS-1):
      a. Corian: “Witch Hazel”; as noted on Interior Finish Plans, Interior Elevations and Details
   2. Solid Surface Material for community room (SS-2):
      a. Corian: “Canyon”; as noted on Interior Finish Plans, Interior Elevations and Details
   3. Solid Surface Material for transition strips/thresholds (SS-3):
      a. Corian: “Deep Espresso”; as noted on Interior Finish Plans, Interior Elevations and Details

2.7 FABRICATION OF SOLID SURFACING MATERIAL COUNTERTOPS

A. Fabrication: Fabricate tops in one piece with shop applied backsplashes and edges, unless otherwise indicated. Comply with solid surfacing material manufacturer's recommendations for adhesive& sealers, fabrication and finishing.

B. Solid Surfacing Material Thickness: as indicated.

C. Edges: as indicated.

D. Colors, Patterns and Finishes: Provide materials and products that result in colors of sold surface material complying with the following requirements:

1. Color Range/Price Group: refer to Interior Finish Plans

2.9 INTERIOR MISCELLANEOUS ORNAMENTAL ITEMS FOR STAINED FINISH

A. Quality Standard: Comply with AWI Section 700. Grade: Custom.

B. Lumber Species: Birch (verify to match existing panels), defect-free, or another approved, closed-grain hardwood listed in referenced woodworking standard.

C. Stain & Finish: to match existing wood panels; 2 color stain

2.7 CABINET HARDWARE AND ACCESSORY MATERIALS

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Division 8 Section "Finish Hardware."

B. Hardware Standard: Comply with ANSI/BHMA A156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BHMA numbers of referenced to this standard.

C. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A 156.18 for BHMA code number indicated.

1. Satin Nickel- verify

2.8 HARDWARE SCHEDULE

A. Cabinet Hardware: Provide cabinet hardware for millwork, in finish indicated and as follows:

1. Cabinet Door Hinges: Provide 110 degree opening concealed hinges compatible with flush overlay cabinet design. Submit for approval.
2. 4” Wire Pull: Black, submit for approval
3. Drawer Slides: to be self-closing design, epoxy powder coated to match drawer body color, with positive in-stop, out-stop and out-keeper to maintain drawer in 80% open position. Captive Nylon rollers, front and rear. Minimum 100 lb. dynamic load rating at 50,000 cycles. Accuride, Fulterer, K & V, or approved equal.
   a. K&V file drawer slide #8400.
   b. K&V pencil drawer slide #8400.
   c. K&V drawer slide #1428.
4. Catches: Provide one top mounted magnet catch for base and wall cabinet doors. Provide two at each tall cabinet door. EPCO #1000 or approved equal.
5. Adjustable Shelf Supports:
   a. Back and End Supports: K&V solid brass spoon clip – 1/4", recessed flush into cabinet sides.
6. Locks: Schlage cabinet lock #CL1009PB or equal by National Cabinet Lock.

2.9 FASTENERS AND ANCHORS

A. Screws: Select material, type, size, and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
B. For metal framing supports, provide screws as recommended by metal framing manufacturer.
C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
D. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

PART 3 – EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Quality Standard: Install wood work to comply with AWI Section 1700 for same grade specified in Part 2 of this section for type of woodwork involved.
B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 8’-0” for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.
C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, sue fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
E. Standing and Running Trim and Rails: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns and miter at corners.
F. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of cabinets with transparent finish.
G. Tops: Anchor securely to base units and other support systems as indicated.

H. Wainscot: Anchor wood veneer to supporting substrate with concealed panel-hanger clips and by blind nailing on backup strips, splined-connection strips, and similar associated trim and framing. Do not face nail unless otherwise indicated.

I. Refer to the Division 9 sections for final finishing of installed architectural woodwork.

3.3 ADJUSTMENT AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that woodwork is being without damage or deterioration at time of Substantial Completion.

END OF SECTION 06 4023

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PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY:

A. Section Includes: through-penetration firestop systems for penetrations through the following fire-resistance rated assemblies, including both blank openings and openings containing penetrating items:

1. Floor-ceiling assemblies.
2. Walls and partitions.
3. Smoke barriers.
4. Construction enclosing compartmentalized areas.

B. Related Sections include the following:

1. Structural drawings – Section “Cast-In-Place Concrete”
2. Structural drawings – Section “Unit Masonry”
3. Division 7 – Section “Joint Sealants”
4. Division 9 – Section “Gypsum Board Assemblies”
5. Mechanical drawings – Section “Plumbing”
6. Mechanical drawings – Section “Plumbing Thermal Insulation”
7. Mechanical drawings – Section “HVAC”
8. Mechanical drawings – Section “Mechanical Thermal Insulation”
9. Electrical drawings – Section “Electrical”
10. Communication drawings – Section “Communications”

1.3 PERFORMANCE CRITERIA

A. FIRE TEST REQUIREMENTS

1. Underwriters Laboratories, Inc. (UL):
   a. ANSI/ UL1479, “Fire Tests of Through Penetration Firestops”.
   b. ANSI/ UL263, “Fire Tests of Building Construction and Materials”.
   c. ANSI/ UL723, “Surface Burning Characteristics of Building Materials”.
2. American Society of Testing and Materials (ASTM):
   a. ASTM E-814, “Fire Tests of Penetration Fire Stops”.
   b. ASTM E-119, “Fire Tests of Building Construction and Materials”.
   c. ASTM E-84, “Surface Burning Characteristics of BuildingMaterials”.
   d. ASTM E2174, “Standard Practice for On Site Inspection of Installed Fire Stops”.

B. REFERENCES

1. Underwriters Laboratories (UL) of Northbrook, IL “Fire Resistance Directory”.
   a. Through Penetration Firestop Systems (XHEZ)
   b. Fill, Void or Cavity Materials (XHHW)
   c. Firestop Devices (XHJI)
   d. Forming Materials (XHKU)
   e. Wall Opening Protective Materials (CLIV)

2. All major building codes:
   a. International Building Code published by ICC.
3. National Fire Protection Association (NFPA) of Quincy, MA “NFPA 101: Life Safety Code”.
4. NFPA “NFPA 70: National Electrical Code”.
5. Factory Mutual Approvals (FM) of Norwood, MA “FM 4991: Standard for Approval of Firestop Contractors”.
6. Underwriters Laboratories (UL) of Northbrook, IL “UL Qualified Firestop Contractor Program”

C. PERFORMANCE REQUIREMENTS

1. Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
2. When intumescent products are used, provide products that do not contain sodium silicate or any other water soluble intumescent ingredient in the formulation.
3. Provide firestop products that do not contain ethylene glycol.
4. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
5. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
6. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur. Such devices shall be:
   a. Capable of retrofit around existing cables
   b. Designed such that two or more devices can be ganged together
   c. Maintenance free such that no action is required to activate the smoke and fire sealing mechanism
7. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
8. Provide through-penetration firestop systems and fire-resistive joint systems subjected to an air leakage test conducted in accordance with the Standards, ANSI/ UL1479 for penetration firestop systems, with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the fire-resistive joint system to restrict the movement of smoke.
9. Provide T-Rating Collar Devices tested in accordance with ASTM E-814 or ANSI/UL1479 for metallic pipe penetrations requiring T-Ratings per the applicable building code.
10. Provide a fire-rated grommet for all individual or small grouped cable applications up to 0.53 in. (14 mm).
11. Provide moisture-curing products where inclement weather or greater than transient water exposure is expected.

1.4 SUBMITTALS

A. Product Data: For each type of through-penetration firestop system product indicated.

B. System Drawings: Submit documentation from a qualified third-party testing agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.

C. Product Certificates: Certificate of conformance signed by manufacturers of through-penetration firestop system products certifying that products comply with requirements.

1.5 QUALITY ASSURANCE

A. Provide through-penetration firestop systems that comply with the following requirements and those specified in “Performance Criteria” Article:

1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
2. Through-penetration firestop system products bear classification marking of qualified testing and inspection agency.

B. Engage an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991, Certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer’s willingness to sell its firestopping products to Contractor or to an installer engaged by Contractor does not in itself confer qualifications on buyer.

C. Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from a single manufacturer.

D. Conduct conference at Project site to comply with requirements in Division 1 Section “Project Meetings”.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturer’s labels identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency’s classification marking; and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

1.7 PROJECT CONDITIONS

A. Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limitations recommended by manufacturer.

B. Do not install through-penetration firestop systems when substrates are wet due to rain, frost, condensation, or other causes.

C. Do not use materials that contain flammable solvents.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.

C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

PART 2 PRODUCTS

2.1 FIRESTOPPING, GENERAL

A. Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Provide components for each through-penetration firestop system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

2.2 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through-penetration firestop systems (XHEZ) and wall opening protective materials (CLIV) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

1. Acceptable Manufacturers:
   a. Specified Technologies Inc., 210 Evans Way, Somerville, NJ 08876. Tel: (800) 992-1180, Fax: (908) 526-9623, Email: specseal@stifirestop.com, Website: www.stifirestop.com.
   b. Tremco Commercial Sealants and Waterproofing
   c. 3M
2. Substitutions: as provided in Division 1
3. Single Source: Obtain firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

2.3 MATERIALS

A. General: Use only firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.

B. Intumescent Sealants: Single component intumescent latex formulations containing no water soluble intumescent ingredients capable of expanding a minimum 8 times, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant
2. Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant

C. Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant

D. Firestop Devices: Factory-assembled steel collars lined with intumescent material capable of expanding a minimum 30 times sized to fit specific outside diameter of penetrating item, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars
2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars

E. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings, the following products are acceptable:
   1. Specified Technologies Inc. (STI) EZ-Path Fire Rated Pathway

F. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24" (610 mm), the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads
   2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads

G. Firestop Putty: Intumescent, 100% solids, non-hardening, water resistant, butyl rubber based putties containing no solvents or silicone compounds, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty

H. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film and capable of expanding a minimum 30 times, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series RED2 Wrap Strip
   2. Specified Technologies, Inc. (STI) SpecSeal Series BLU2 Wrap Strip

I. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating on all six sides contained in a flame retardant poly bag, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows

J. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar

K Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag), the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal SIL300 Silicone Firestop Sealant
   2. Specified Technologies, Inc. (STI) SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant'

L. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam

M Composite Sheet: Intumescent material sandwiched between a galvanized steel sheet and steel wire mesh protected with aluminum foil capable of sustaining a minimum 2,500 lbs (1,134 kg) when subjected to load testing, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal CS Composite Sheet

N. Cast-In-Place Firestop Device: Single component molded firestop device installed on forms prior to concrete placement with totally encapsulated, tamper-proof integral firestop system and smoke sealing gasket, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal CD Cast-In Firestop Device

O. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal FyreFlange Firestop Angles

P. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material capable of expanding minimum 10 times with expansion beginning at 350°F (177°C) for use in blank openings and cable sleeves, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series FP Firestop Plug

Q. Fire-Rated T Rating Collar Device: Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal T-Collar Device

R. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing cable penetrations up to 0.53 in. (14 mm) diameter, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) Ready Firestop Grommet (RFG1 or RFG2)

S. Fire-Rated Closet Flange Gasket: Molded, single-component, intumescent gasket for use beneath a closet flange in floor applications, the following products are acceptable:
   1. Specified Technologies, Inc. (STI) SpecSeal Series CF34 Closet Flange Firestop Gasket

PART 3 EXECUTION

3.1 PREPARATION

A. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

B. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.

C. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General Requirements: Install through-penetration firestop systems in accordance with “Performance Criteria” Article and in accordance with the conditions of testing and classification as specified in the published design.

B. Manufacturer’s Instructions: Comply with manufacturer’s instructions for installation of through-penetration firestop systems products.
   1. Seal all openings or voids made by penetrations to ensure an air and water resistant seal.
   2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
   3. Protect materials from damage on surfaces subjected to traffic.

3.3 FIELD QUALITY CONTROL

A. Inspections: Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems in accordance with ASTM E2174, “Standard

Practice for On Site Inspection of Installed Fire Stops". NOTE: Manufacturers are not qualified inspection agencies, and it is a conflict of interest for the manufacturer to perform inspections of installed firestopping systems according to the aforementioned inspection standards.

B. Keep areas of work accessible until inspection by authorities having jurisdiction.

C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.4 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed openings to be free of excess through-penetration firestop system materials and soiling as work progresses.

END OF SECTION 07 8413

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JOINT SEALANTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes joint sealants for the following locations:
   1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
      b. Joints between different materials.
      c. Perimeter joints between materials listed above and frames of doors and windows.
      d. Other joints as indicated.
   2. Exterior joints in horizontal traffic surfaces as indicated below:
      a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
      b. Other joints as indicated.
   3. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
      a. Interior corners in Ceramic Tile Work.
      b. Joints between plumbing fixtures and wall and floors.
      c. Joints between countertops and walls.
      d. Perimeter joints of exterior openings where indicated.
      e. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
      f. Other joints as indicated.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 08 Section “Aluminum Entrances and Storefronts” for sealants used in glazing.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data from manufacturers for each joint sealant product required.

C. Samples for initial selection purposes in form of manufacturer’s standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

1.5 QUALITY ASSURANCE

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer's instructions, site conditions, or applicable codes and standards; request clarification from the Architect before proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Install Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

C. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

D. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturer's samples of materials that will contact or affect joint sealants for compatibility and adhesion testing as indicated below.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
2. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4.4 deg C).
3. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS:

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide color of exposed joint sealants to comply with the following:

1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

2.2 ELASTOMERIC JOINT SEALANTS

A. Urethane Elastomeric Joint Sealants: Non-sag urethane sealant complying with ASTM C 920, for vertical and horizontal joints, exterior and interior use.

B. Products: Subject to compliance with requirements, provide one of the products:

1. Multi-Part Nonsag Urethane Sealant for Use T:
   a. “Chem-Calk 500”; Bostik Construction Products Div.
   b. “Vulkem 227”; Mameco International, Inc.
   c. “Dynatred”; Pecora Corp.
   d. “PRC 280”; Products Research & Chemical Corp.
   e. “Sikaflex 2c NS”; Sika Corp.
   f. “THC-901”; Tremco, Inc.
2. Multi-Part Nonsag Urethane Sealant, for use NT, use one of the following products:
   a. “Chem-Calk 500”; Bostik Construction Products Div.
   b. “Vulkem 227”; Mameco International, Inc.
   c. ”Vulkem 922”; Mameco International, Inc.
   d. “Dualthane”; W.R. Meadows.
   e. “Dynatrol II”; Pecora Corp.
   f. “Permapol RC-2”; Products Research & Chemical Corp.
   g. “Sikaflex 2c NS”; Sika Corp.
   h. “Sonolastic NP 2”; Sonneborn-Rexnord.
   i. “Dymeric”; Tremco, Inc.

C. Silicone Elastomeric Joint Sealants: One-part non-acid curing silicone sealant complying with ASTM C 920, for vertical joint, exterior and interior use.

1. One-part mildew resistant silicone sealant complying with ASTM C 920, for sanitary applications, interior use.
2. Products: Subject to compliance with requirements, provide one of the products.
   a. Sanitary Silicone Sealant:
      (1) “Sanitary 1700”; GE.
      (2) “786’; Dow Corning.
      (3) “863 #345 White”; Pecora Corp.

2.3 SOLVENT-RELEASE-CURING JOINT SEALANTS

A. Acrylic Sealant: Manufacturer’s standard one part, paintable, nonsag, solvent-release-curing acrylic terpolymer sealant complying with AAMA 808.3 or FS TT-S-00230 or both, with capability when tested for adhesion and cohesion under maximum cyclic movement per ASTM C719, to withstand the following percentage change in joint width existing at time of application and remain adhered to joint substrates indicated for Project without failing cohesively:

1. 12-1/2 percent movement in both extension and compression for a total of 25 percent.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Acrylic Sealant:
   a. “60+Unicrylic”; Pecora Corp.
   b. “PTI 738”; Protective Treatments, Inc.
   c. “PTI 767”; Protective Treatments, Inc.
   d. “Mono”; Tremco, Inc.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
2. Proprietary, reticulated, closed-cell polymeric foam, nonoutgassing, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623, and with water absorption less than 0.02 gms/cc per ASTM C 1083.
3. Backing shall be 25% wider than joint openings.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicted.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonpourous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonpourous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contract of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Mildew resistant silicone sealant shall be used for all joints in toilet areas.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
    a. Do not leave gaps between ends of joint fillers.
    b. Do not stretch, twist, puncture, or tear joint fillers.
    c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration

indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 62, unless otherwise indicated.
    a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

G. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 9200

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following products manufactured in accordance with SDI Recommended Standards.

1. Doors: Flush, seamless, hollow or composite construction standard steel door for interior locations, insulated for exterior locations.
2. Frames: Pressed steel frames for doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior openings of following type:
   a. Fully Welded unit type. – Thermally broken at exterior door assemblies.
3. Assemblies: Provide standard steel door and frame assemblies as required for the following:
   a. Labeled and fire rated.
   b. Provide factory primed doors and frames to be field painted.
   c. Thermal rated (insulated).

B. Related sections: The following Sections contain requirements that relate to this Section:

2. Division 08 Section “Flush Wood Doors” for wood doors installed in steel frames.
3. Division 08 Section “Door Hardware” for door hardware and weather stripping.
4. Division 08 Section “Glazing” for glass in steel doors, sidelights and window frames.
5. Division 09 Section “Gypsum Board Assemblies” for spot grouting and building in of frames in gypsum board partitions.
6. Division 09 Section “Painting” for field painting of primed doors and frames.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

C. Shop drawings showing fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.

1.4 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

B. Fire-Rated Door Assemblies: Units that comply with NFPA 8, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E 152 and which are labeled and listed by UL, Factory Mutual Warnock Hersey, or other testing and inspecting organization acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4 inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide ¼ inch spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering standard steel doors and frames which may be incorporated in the work include; but are not limited to, the following:

1. Standard Steel Doors and Frames:
    a. Amweld Building Products, Inc.
    b. Ceco Corp.
    c. Curries Company.
    d. Pioneer Industries.
    e. Republic Builders Products
    f. Steelcraft Manufacturing Co.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 (ASTM 5696M).

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel complying with ASTM A 366 (ASTM A366M) or ASTM A 620 (ASTM 620M), drawing quality, special killed.

C. Galvanized Steel Sheets: Zinc-coated steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating designation, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.

F. Shop Applied Paint: Apply after fabrication.

1. Primer Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames”.

2.3 DOORS

A. Provide metal doors of SDI grades and models specified below or as indicated on drawings or schedules:
   1. Interior Doors: ANSI/SDI-100, Grade I, standard-duty, Model 2, minimum 16 gage cold-rolled sheet steel faces.
   2. Exterior Doors: ANSI/SDI-100, Grade III, extra heavy-duty, Model 4, minimum 14 gage galvanized steel faces.

B. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C 236 or ASTM C 976 on fully operable door assemblies.
   1. Unless otherwise indicated, provide thermal-rated assemblies in U factor of 0.37 Btu (hr x sq ft x deg F.) or better.

2.4 FRAMES

A. Provide metal frames for doors, transoms, sidelights, borrows lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated.
   1. Frames to be fabricated of either cold-rolled steel or galvanized steel (as specified). All exterior frames will be made of 14 gauge steel. All interior frames will be made of 16 gauge steel. All joints to be die-mitered with integral tabs for reinforcement and interlocking of the jambs to the head. All face joints shall be continuously welded and ground smooth. All frames to be mortised, reinforced, drilled and tapped for all mortised finish hardware. All frames to be reinforced for surface-mounted hardware as specified by template requirements. The following components shall be considered minimum. Hinge reinforcement (7 gauge x 1-5/8” x 10”). Lock strike reinforcing (14 gauge x template requirements). Closer reinforcing (12 gauge x contour of head jamb x 16”).
   2. Provide 60 minute welded fire rated interior window frames where indicated. Coordinate glazing with Section 8 “Glazing”

B. Door Silencers: Except on weather stripped frames, drill stops to receive 3 silencers on strike jambs of single door frames and 2 silencers on double door frames.

C. Plaster Guards: Provide minimum 26 gauge steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

D. Door Stops: Provide 5/8” deep-typical.

2.5 FABRICATION, GENERAL

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer’s plant. Clearly identify work that cannot be permanently factory-assembled before

shipment, to assure proper assembly at project site. Comply with ANSI/SDI-100 requirements.

1. Internal Construction: Manufacturer's standard honeycomb, polyurethane, polystyrene, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets where appropriate in accordance with SDI standards.
2. Clearances: Not more than 1/8 inch at jambs and heads except between non-fire-rated pairs of doors not more than ¼ inch. Not more than ¾ inch at bottom.

B. Fabricate exposed faces of doors and panels from only cold-rolled steel.

C. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames".

D. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

F. Floor Clips: 14 gauge angle clips welded to interior throat of frame.

G. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and template provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series Specifications for door and frame preparation for hardware.

H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.

1. Provide 14 gauge steel internal steel reinforcement for closers.

I. Locate hardware as indicated on final shop drawings or, if not indicated in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames", published by Door and Hardware Institute.

J. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

1. Clean steel surfaces of mill scale, rust, oil grease, dirt, and other foreign materials before application of paint.
2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

K. Glazing Stops: Minimum 20 gauge steel or .040 inch thick aluminum.

1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
2. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

1. Except for frames located at existing concrete, masonry or drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surface smooth and undamaged.
2. Install fire-rated frames in accordance with NFPA Standard No. 80.
3. In wood stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed stud partitions, attach wall anchors to studs with screws.
4. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
5. At in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.

C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.
1. Install fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.2 ADJUST AND CLEAN

A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08 1113

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FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. Extent and location of each type of flush wood door is indicated on drawings and in schedules.

B. Types of doors required include the following:

1. Solid core flush wood doors with veneer faces.

C. Metal door frames, casings for flush wood doors are specified in another Division 08 Section.

1.3 SUBMITTALS

A. Product Data: Door manufacturer's technical data for each type of door, including details of core and edge construction, and trim for openings and louvers.

B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.

1. For factory-machined doors, indicate dimensions and locations of cut-outs for locksets and other cutouts adjacent to light and louver openings.

C. Samples: Submit samples, 12-inches square or as indicated, for the following:

1. Doors for Stained Finish: Door faces with solid wood edging representing typical range of color and grain for each species of veneer and solid lumber required**;** up to 2 color variations may be required to match existing doors from different areas
2. Metal Frames for Light Openings: Metal light frames in 6-inch lengths; for each material, type and finish required.

1.4. QUALITY ASSURANCE

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer's instructions, site conditions, or applicable codes and standards; request clarification from the Architect before proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Quality Standards: Comply with the following standards:

1. AWI Quality Standards: "Architectural Woodwork Quality Standards", including Section 1300 "Architectural Flush Doors" of Architectural Wood work Institute (AWI) for grade of door, core construction, finish and other requirements exceeding those of NWWDA quality standard.

C. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152 and which are labeled and listed for fire ratings indicated by UL, or other testing and inspection agency acceptable to authorities having jurisdiction.

E. Manufacturer: Obtain doors from a single manufacturer.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect wood doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install and Maintain Wood Doors" and with manufacturer's instructions.

B. Identify each door with individual opening numbers which correlate with shop drawings for doors, frames and hardware, using temporary, removable or concealed markings.

1.6 PRODUCT CONDITIONS

A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during remainder of construction period to comply with the following requirements applicable to Projects geographical location:.

1. Referenced AWI quality standard including Section 100-S0-3 "Moisture Content".

1.7 WARRANTY

A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup or twist) more than ¼ inch in 42 by 84 inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in 3 inches of span, or do not conform to tolerance limitations of referenced standards.

1. The warranty shall also include reinstallation which may be required due to repair or replacement of defective doors where defect was not apparent to hanging.
2. Warranty shall be in effect during following period of time after date of Substantial Completion.
3. Solid Core Interior Doors:
    a. Life of installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide doors of one of the following:

1. Solid Core Doors with Wood Veneer Faces:
    a. VT Industries.
    b. Eggers Industries, Architectural Door Division.
    c. Masonite.
    d. Bayer Built Woodworks

2.2 INTERIOR FLUSH WOOD DOORS

A. Solid Core Doors with pre-finish Stained Finish: Comply with the following requirements:
Basis of Design: VT Industries, (VERIFY WOOD VENEER SPECIES with EXG DOORS – MATCH SPECIES AND STAIN COLOR – VERIFY WITH ARCHITECT)

1. Faces: Flush, (VERIFY WOOD SPECIES)
2. AWI Grade: Custom.
3. Construction: PC-5 (Particleboard core, 5-ply)

4. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.
5. Finish: Custom stain to match Basis of Design.

B. Fire-Rated Solid Core Doors: Comply with the following requirements:
1. Faces and AWI Grade: Provide faces and grade to match non-rated doors in same area of building, unless otherwise indicated.
2. Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
3. Edge Construction: Provide manufacturer's standard laminated edge construction for improved screw-holding capability and split resistance as compared to edges composed of a single layer of treated lumber.

2.3 LIGHT FRAMES

A. Metal Frames for Light Openings in Fire Doors: Manufacturer's standard frame formed of 18 gauge cold-rolled steel, factory-primed, and approved for use in door for fire-rating indicated.

2.4 FABRICATION

A. Fabricate flush wood doors to produce doors complying with the following requirements:
1. Factory-prefit and machine doors to fit frame opening sizes indicated with the following uniform clearances and bevels.
a. Comply with tolerance requirements of AWI for pre-fitting. Comply with final hardware schedules and door frame shop drawings and with hardware templates.
b. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory pre-machining.

B. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of doors required.

C. Light Openings: Factory cut openings. Trim openings for non-fire-rated doors with solid wood moldings of profile shown.

D. Finish: Factory finish to match existing; stain color and finish.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine installed door frames prior to hanging doors:
1. To verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
2. Reject doors with defects

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation see Division 08 "Door Hardware" section of these specifications.

B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and of referenced AWI standard and as indicated.

C. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

D. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors, if any. Machine doors for hardware. Seal cut surfaces after fitting and machining.

E. Fitting Clearances: For non-rated doors provide 1/8" at jambs and heads; 1/16" per leaf at meeting stiles for pairs for doors; and 1/8" from bottom of door to top of decorative floor finish or cover. Where threshold is shown or scheduled, provide ¼" clearance from bottom of door to top of threshold.

F. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.

G. Bevel non-rated doors 1/8" in 2" at lock and hinge edges.

H. Bevel fire-rated doors 1/8" in 2" in lock edge; trim stiles and rails only to extent permitted by labeling agency.

I. Prefit Doors: Fit to frames for uniform clearance at each edge.

J. Factory-Finished Doors: Refer to the following for finishing requirements:

1. Finish shall be a Premium Grade alkyd area conversion varnish system conforming to AWI Section 1500, System TR-4.
2. Pre-finish stain finish.

3.3 ADJUSTING AND PROTECTION

A. Operation: Rehang or replace doors which do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 08 2120

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes access doors and fire-rated access doors for installation in the following types of construction:

1. Existing clay tile/plaster walls and Gypsum Drywall and/or plaster walls and ceilings.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specifications Sections.

B. Product Data in form of manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage, devices.

C. Shop drawings showing fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.

1.4. QUALITY ASSURANCE

A. Provide access door assemblies with panel door, frame, hinges, and latches from manufacturer listed in Underwriter's Laboratories, Inc., "Classified Building Material Index", for rating indicated. Provide UL label on each access door required to be fire rated.

B. Single-Source Responsibility: Obtain access doors for entire project from one source from a single manufacturer.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.

D. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

1.5 PROJECT CONDITIONS

A. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.

B. Store under cover in a dry location, supported above the ground with at least ¼" air space between individual units. Store doors upright.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors which may be incorporated in the work include, but are not limited to, the following:

1. Cesco Products

2. Karp Associates, Inc.
3. Milcor, Inc.
4. Nystorm, Inc.

2.2 MATERIALS AND FABRICATION

A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.

B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

C. Frames: Fabricate from 16-gage steel.
   1. For gypsum drywall furnish perforated frames with drywall bead.

D. Flush Panel Doors: Fabricate from not less than 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees and self closing for fire rated doors.

E. Finish: Finish with manufacturer's standard factory-applied, chemically bonded and baked on prime coat.

F. Locking Devices: Furnish, flush, key-operated locks, one per door, with interior release operable without key or special tool; self latching for fire rated doors; key locks alike, furnish two keys per lock.

G. Continuous Closer: Spring Closer to assure positive latching as door closes automatically.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine areas and conditions where access doors are to be installed. Notify the Architect of Conditions detrimental to proper installation or function of access door assemblies. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions for installation of access doors.

B. Coordinate installation with work of other trades.

C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

3.3 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

END OF SECTION 08 3050

ROLLING COUNTER SHUTTERS

PART 1 – GENERAL

1.1 SUMMARY
- A. Section Includes: manual rolling counter doors, mounted to face of wall
- B. Related Sections:
  1. 05 50 00 Metal Fabrications. Door opening jamb and head members
  2. 06 10 00 Rough Carpentry. Door opening jamb and head members

1.3 SUBMITTALS
- A. Reference Section 01 33 00 Submittal Procedures; submit the following items:
  1. Product Data
  2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
  3. Quality Assurance/Control Submittals:
     a. Provide manufacturer ISO 9001:2015 registration
     b. Provide manufacturer and installer qualifications - see below
     c. Provide manufacturer's installation instructions
  4. Closeout Submittals:
     a. Operation and Maintenance Manual
     b. Certificate stating that installed materials comply with this specification

1.4 QUALITY ASSURANCE
- A. Qualifications:
  1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing counter doors of the type specified
  2. Installer Qualifications: Manufacturer’s approval

1.5 DELIVERY STORAGE AND HANDLING
- A. Reference Section 01 66 00 Product Storage and Handling Requirements.
- B. Follow manufacturer’s instructions.

1.6 WARRANTY
- A. Standard Warranty: Two years from date of shipment against defects in material and workmanship
- B. Maintenance: Submit for owner’s consideration and acceptance of a maintenance service agreement for installed products

PART 2 - PRODUCTS

2.1 MANUFACTURER
- A. Manufacturer:
  1. Cornell: 24 Elmwood Avenue, Mountain Top, PA 18707. Telephone: (800) 233-8366.
  2. Cookson
  3. Clopay Building Products
  4. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PRODUCT INFORMATION
- A. Model: ESC10

2.3 MATERIALS
- A. Curtain:
  1. Slat Configuration:
     a. Aluminum: No. 1F, interlocked flat-faced slats, 1-1/2 inches (38 mm) high by 1/2 inch (13 mm) deep, minimum 0.040 inch aluminum with extruded tubular aluminum bottom bar with continuous lift handle and vinyl astragal
  2. Finish:

a. Aluminum: Dark Bronze anodized

B. Endlocks:
Fabricate interlocking slat sections with high strength molded nylon endlocks riveted to ends of alternate slats

C. Guides:
1. Fabrication:
a. Aluminum: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners. Provide polypropylene pile runners on both sides of curtain to eliminate metal to metal contact between guides and curtain.
2. Finish:
a. Aluminum: Dark Bronze anodized

D. Shaft Assembly:
1. Counterbalance Shaft Assembly:
a. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width
b. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque

E. Brackets:
Fabricate from reinforced steel plate with bearings at rotating support points to support counterbalance shaft assembly and form end closures
1. Finish:
a. **SpectraShield® Coating System (Color Selected by Architect):** Zirconium treatment followed by baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range, over 180 colors; minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better

F. Hood:
Minimum 0.040 inch (1.016 mm) aluminum with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets.
1. Finish:
a. Aluminum: Dark Bronze anodized

2.4 OPERATION
A. Manual Operation:
1. Push-Up: Manual lift or pole with hook

2.5 ACCESSORIES
A. Locking:
1. Padlockable slide bolt: Padlockable slide bolt on coil side of bottom bar at each jamb extending into slots in guides. Provide interlock switches on motor operated units.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings
B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates
C. Commencement of work by installer is acceptance of substrate

3.2 INSTALLATION

A. Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports
B. Follow manufacturer's installation instructions

3.3 ADJUSTING
A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion

3.4 CLEANING
A. Clean surfaces soiled by work as recommended by manufacturer
B. Remove surplus materials and debris from the site

3.5 DEMONSTRATION
A. Demonstrate proper operation to Owner's Representative
B. Instruct Owner's Representative in maintenance procedures

END OF SECTION 08 3300

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ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes all labor, material, equipment and related services necessary to furnish and install aluminum entrances and fixed aluminum sidelights as indicated in the Drawings or as specified herein.

B. Related Sections:

1. Division 07 Section “Joint Sealants”
2. Division 08 Section “Door Hardware”
3. Division 08 Section “Glazing”

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specifications Sections.

B. Product Data in form of manufacturer’s technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage, devices.

C. Shop drawings showing fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.

D. Test Reports: Submit reports of tests performed by an independent testing laboratory indicating that the exterior aluminum storefront and entrance framing system meets the performance requirements specified.

1.4. QUALITY ASSURANCE

A. Design Requirements: Design and construct aluminum entrances and storefront in accordance with the Minnesota State Building Code to resist a wind load based on Exposure B and a Basic Wind Speed of 90 mph. The minimum design load shall be 20 pounds per square foot.

B. Interior frames shall be designed to withstand a minimum live load of 10 pounds per square foot normal to the surface.

C. Thermal movement: Aluminum entrances and storefronts shall be designed to withstand thermal movements resulting from an ambient temperature range of 120 degrees F. and a surface temperature range on the framing of 180 degrees F.

D. Structural Properties: The deflection of any framing member in a direction normal to the plane of the wall shall not exceed 1/175 of the clear span, or ¾” whichever is less, when tested in accordance with ASTM E330-02 at the wind loads specified above.

E. Air Infiltration: Air infiltration through entrance and storefront framing shall not exceed 0.06 cfm per square foot when testing in accordance with ASTM E283-04 at a test pressure differential of 6.24 pounds per square foot.

F. Water Penetration: There shall be no water leakage (as defined by ASTM E331) through entrance and storefront framing when tested in accordance with ASTM E331-00 at an inward test pressure differential of 6.24 pounds per square foot.

G. Condensation Resistance: Thermal break framing members shall have a minimum CRF Class of C55 when tested in accordance with AAMA 1503-98.

H. Thermal Transmittance: The entrance and storefront system shall have a minimum U-Class designation of U70 when tested in accordance with AAMA 1503-98.

1.5 PROJECT CONDITIONS

A. Store under cover in a dry location, supported above the ground with at least ¼" air space between individual units. Store doors upright.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering aluminum entrances and storefronts which may be incorporated in the work include, but are not limited to, the following:

1. Kawneer
2. EFCO
3. CMI Architectural
4. United States Aluminum
5. Tubelite

2.2 MATERIALS

A. Extruded Aluminum: All aluminum doors, entrance frames, and window frames shall be extruded from 6063-T5 alloy. ASTM B221-05a.

B. Sealant to be Mono by Tremco or approved product as recommended by manufacturer.

2.3 DOORS

A. "CMI Architectural 452 series Wide Stile" doors, 4 1/2" head & stiles and 10" ADA compliant bottom rail.

B. All exterior doors shall have surface applied threshold weather-stripping.

C. Prepare doors for Others glazing, as noted.

D. Reinforce doors with 1 1/4" x 1/8" aluminum bar, continuous on hinge side of door.

2.4 ENTRANCE FRAMES (ALUMINUM FIXED STOREFRONT SIDELIGHT WINDOWS SIMILAR)

A. Exterior Frames: Thermally broken frames CMI Architectural 450TB-CENTER SET (47-025) 2" x 4 1/2" entrance frame system as shown on the drawings.

B. Interior Frames: shall be 2" x 4 1/2" tubular sections designed for flush glazing, unless otherwise indicated.

C. Door frames shall be pile weather-stripped on all door edges.

D. All exterior entrance frames receive 1" insulated glazing by Division 08 "Glazing"

E. Furnish thresholds for all door openings.

F. Reinforce frame with 1 1/4" x 1 1/4" x 3/8" steel angle in frame.

2.5 FASTENERS: for use with aluminum: aluminum or non-magnetic stainless steel; use concealed fasteners where possible.

2.6 STEEL: for reinforcing and brackets: ASTM A36-05. Steel shall be hot dipped galvanized. Galvanizing shall conform to ASTM A123-02, and zinc coating shall weigh not less than 2.0 ounces per square foot of surface.

2.7 GLAZING GASKETS: Dense elastomeric molded or extruded EPDM, neoprene or thermoplasatic polyolefin rubber gaskets conforming to ASTM C 509-06.

2.8 COMPRESSION WEATHERSTRIPPING: Molded neoprene conforming to ASTM D2000-06 or molded PVC conforming to ASTM D2287-96 (2001). Weatherstripping shall be replaceable.

2.9 FINISH SPECIFICATIONS – All exposed surfaces shall be free of scratches and other serious blemishes and shall have an etched, anodized finish, ANO-304 AE; ANODIZED ALUMINUM DARK BRONZE (verify), class 1 (0.7 mil)

2.10 HARDWARE – Dark Bronze (Verify) (BHMA 695 / US 10BE /SP313 painted steel)

GROUP: 1 (exterior double door w/ stationary mullion)
(EACH LEAF TO HAVE:)

Qty		Description	Catalog Number	Mfr
1	EA	CONTINUOUS HINGE	700	IVE
1	EA	RIM EXIT DEVICE	CD-QM-NL-OP-710-3’-CYL-AL-P	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	OFFSET PULL	8190 HD-0 (695)	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH-695	LCN
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	DRIP CAP		ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER

GROUP: 2 (exterior single door)

Qty		Description	Catalog Number	Mfr
1	EA	CONTINUOUS HINGE	700	IVE
1	EA	RIM EXIT DEVICE	CD-QM-NL-OP-710-3’-CYL-AL-S	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	OFFSET PULL	8190 HD-0 (695)	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH-695	LCN
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	ZER
1	EA	DRIP CAP		ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	8655	ZER

GROUP: 3 (interior vestibule single door)

Qty		Description	Catalog Number	Mfr
1	EA	CONTINUOUS HINGE	700	IVE
1	EA	PUSH/PULL	9190HD PUSH/PULL 10” OFFSET-695	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP SCUSH-695	LCN

2.11 Materials The hardware schedule in part 2.10 has been prepared using the manufacturers and finishes listed below, unless otherwise specifically noted within the schedule.
NOTE: VERIFY ALL FINISHES WITH ARCHITECT.

ITEM	MANUFACTURER	FINISH
Hinges	Ives, Stanley, Hager, McKinney	631 (Matte Black – US19)
Cylinders	by Others - see Section 08 7100	
Closers	LCN, Yale, Norton	Factory Paint
Wall Stops	Ives, Hager, Hiawatha	631
Thresholds	Zero, National, Reese, NGP	Aluminum (Black)
Sweeps	Zero, Reese, Pemko, NGP	Aluminum (Black)
Weather-strip	Zero, Reese, Pemko, NGP	Black
Push Plates, Pull	Ives, Hiawatha, Hager	631
Exit Devices	Von Duprin, Precision	631

- NOTE: FOR ALUMINUM ENTRY DOORS, PROVIDE DARK BRONZE FINISH

PART 3 EXECUTION

3.1 Aluminum Door: Main frame assembly and hardware shall be installed according to manufacturer's recommendations, and anchored securely at jambs, head and sidelight sills. Seal with specified sealant per manufacturer's recommendations to form watertight joint between frame and surrounding construction.

3.2 Fabrication

A. `The framing system shall provide for a flush glazing appearance, with no projecting stops. Framing members shall be of sizes as detailed.

B. The adhered aluminum mullions and trim shall be standard extrusion shapes and sizes as detailed.

C. Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion.

D. Maintain accurate relation of planes and angles, with hairline fit of contacting members.

E. Conceal fasteners wherever possible.

3.3 Installation

A. Installer must examine the surrounding structure and the conditions under which the work is to be erected, and notify the architect in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until satisfactory conditions have been corrected in a manner acceptable to the installer.

B. Protect aluminum in contact with masonry, concrete, steel and other dissimiliar materials from galvanic and corrosive action with non-absorbent plastic or elastomeric tapes or gaskets or a coat of paint applied prior to erection. Protection shall conform to the recommendations contained in the paragraph "Dis-similar Materials" in Appendix B of AAMA/NWWDA 101/I.S.2-97.

C. Set units plumb, level, and true to line, without warp or rack of framing members doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

D. Set sill members and other members in a bed of compound as shown, or with joint fillers or gaskets as shown to provide weather-tight construction.

E. Drill and tape frames and doors and apply surface mounted hardware items, complying with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

F. Finish hardware mounting heights to match those called out in Section 087100, unless noted otherwise on drawings or in this section.

3.4 Adjusting and Cleaning

A. Adjust operating hardware to function properly, without binding, and to provide tight fit at contact points and weather-stripping.

B. Clean completed system, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and sealant compounds, dirt, and other substances from aluminum surfaces.

END OF SECTION 08 4113

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DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

B. RELATED WORK IN OTHER SECTIONS

a. Division 06 Section “Rough Carpentry”
b. Division 08 Section “Hollow Metal Doors & Frames”
c. Division 08 Section “Flush Wood Doors”
d. Division 08 Section “Aluminum Entrances & Storefronts”
e. Division 09 Section “Gypsum Board Assemblies”
f. Division 26 Section “Electrical”

1.2 SUMMARY

A. This section includes the following:

1. Furnish door hardware for hollow metal and wood doors specified herein, listed in the hardware schedule, and/ or required by the drawings.
2. Cylinders for Aluminum Doors
3. Hardware, except for cylinders, will be provided by the aluminum door/frame supplier.
4. Thresholds and weather-stripping
5. Electro-Mechanical Devices
6. Access Control components and or systems specified within this section

1.3 SUBMITTALS

A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 1 - General Conditions.

B. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:

1. Door number, location, size, handing, and rating.
2. Door and frame material, handing.
3. Degree of swing.
4. Manufacturer
5. Product name and catalog number
6. Function, type and style
7. Size and finish of each item
8. Mounting heights
9. Explanation of abbreviations, symbols, etc.
10. Numerical door index, indicating the hardware set/ group number for each door.

C. When universal type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).

D. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed with the DHI certification seal of the supervising AHC. The supervising AHC shall attend any meetings related to the project when requested by the architect.

E. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.

F. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or in compatible items, and proposed substitutions in the hardware schedule.

G. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.

H. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 1 - General Conditions.

I. Submit a sample of each type of hardware requested by the architect. Samples shall be of the same finish, style, and function as specified herein. Tag each sample with its permanent location so that it may be used in the final work.

J. Furnish with first submittal, a list of required lead times for all hardware items.

K. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 1 - General Conditions.

L. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.

M. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

N. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of the initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute's publication "Keying Procedures, Systems, and Nomenclature". Submit copies of owner approved key schedule for review and field use in quantities as required by Division 1 - General Conditions. Wiring diagrams shall be included in final submittals transmitted for distribution and field use.

The work in this section includes the furnishing of all finish hardware as described in the specification and as required by hardware group numbers as shown on the drawings. Refer to the general conditions, special conditions and instructions to bidders for other requirements.

1.4 REFERENCES

A. Publication of agencies and organizations listed below form a part of this specification section to the extent referenced.

a. BHMA- Recommended Locations for Builders’ Hardware
b. NFPA 80- Standards for Fire Doors and Windows
c. NFPA 101- Life Safety Code
d. UL- Underwriters Laboratory
e. DHI- Door and Hardware Institute

f. WHI- Warnock Hersey

1.5 QUALITY ASSURANCE

A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function and quality may be considered for prior approval.

B. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc) from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years experience in successful completion of projects similar in size and scope.

D. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.

E. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.

1.6 SCHEDULES

a. Within thirty (30) days after the contract is awarded and before any hardware is ordered, submit copies of a complete, detailed hardware schedule for review. If resubmissions are required, a copy will be returned with proper notations to resubmit copies. After final reviewed schedule is returned send copies and templates to fabricators requiring the same.

b. The schedule cover page shall include the project name hardware supplier, firm name of general contractor, architectural firm, name and manufacturers reference list of symbols used to abbreviate names of hardware manufacturers.

c. Catalog cuts of each piece of hardware shall accompany the hardware schedule.

1.7 TEMPLATES

A. Furnish a final hardware schedule and templates to door frame suppliers. If required, the hardware supplier shall furnish physical hardware to the door and frame manufacturers for application.

B. All reinforcements required to adapt hardware to metal doors or frames shall be supplied by the door and/or frame manufacturers.

1.8 DELIVERY, STORAGE AND HANDLING

A. All hardware shall be delivered to the job site or, upon request to the door and/or frame manufacturers in the manufacturer's original cartons, and shall be clearly marked to correspond with the reviewed hardware schedule.

B. The general contractor shall be responsible for the protection and storage of all hardware. All items shall be packed to prevent damage in transit.

C. Hardware shall include all necessary fasteners. All fasteners shall be of the proper type, size, material and finish for its intended purpose, All screws, exposed either when the door is open or closed shall have phillips heads.

1.9 FINISHES:

Unless otherwise indicated, finishes shall be as follows:

Butts	US19 (Matte Black) (BHMA 631)
Locksets	US19
Closers	Paint Black
Pushes, Pulls, Kick Plates	US19
Stops, Holders	US19
Miscellaneous Items	US19

1.10 KEYING

A. Keying to be verified by owner.

B. All keying shall be done by the factory or by a registered locksmith where permanent keying records shall be kept.

C. Master key all locks

D. Change key

E. Keys required:

1. Building entrances: 3 keys times number of units (standard bow)
2. Other locks: 6 keys for each set

PART 2 - PRODUCTS

ACCEPTABLE MANUFACTURERS

2.1 HINGES

A. The following is a list of butt types which are considered acceptable:

	IVES	STANLEY	HAGER	MCKINNEY
Stnd Wt, Plain Brg	5BP1	F179	1279	T2714
Stnd Wt, Ball Brg	5BB1	BB179	BB1279	TB2714
Stnd Wt, Ball Brg, Non-Ferrous	5BB1	FBB191	BB1191	TB2314
Hvy Wt, Ball Brg	5BB1HW	FBB168	BB1168	T4B3786
Hvy Wt, Ball Brg, Non-Ferrous	5BB1HW	FBB199	BB1199	T4B3386

B. Furnish the following hinge quantities for each door leaf.

1. 3 hinges for doors up to 90 inches
2. 1 additional hinge for every 30 inches on doors over 90 inches
3. 4 hinges for Dutch door applications

C. Furnish hinge weight and type as follows;

1. Standard weight: plain bearing hinge 5PB1 for interior openings through 36 inches wide without a door closer
2. Standard weight: ball bearing hinge 5BB1 for interior openings over 36 through 40 inches wide without a closer and for interior openings through 40 inches wide with a door closer
3. Heavyweight: 4 ball bearing hinge 5BB1HW for interior openings over 40 inches wide and for all vestibule doors.
4. Heavyweight: 4 ball bearing hinges 5BB1HW for exterior openings unless otherwise listed in groups.

D. Furnish hinges for exterior doors, fabricated from brass, bronze or stainless steel; hinges for interior doors may be fabricated from steel.

E. Furnish hinges in the following sizes:

1. 5” x 5” 2 1/4“ thick doors
2. 4 ½” x 4 ½” 1 3/4” thick doors
3. 3 ½” x 3 ½” 1 3/8” thick doors

F. Furnish hinges with sufficient width to accommodate trim and allow for 180 degree swing.

2.2 CONTINUOUS PIN AND BARREL HINGES

Acceptable manufacturers and respective catalog numbers:

	Ives	Marker	Stanley	McKinney
Edge Mount Pin & Barrel Stainless Steel Continuous Hinge	700 Series	300 Series	650 Series	300 Series

Continuous hinges shall be full height pin and barrel type hinge providing full height door support up to 600 lbs. Edge mount (unless noted otherwise).

Construct hinges of heavy-duty 14-gauge material. The stainless internal pin shall have a diameter of 0.25 and the exterior barrel diameter of 0.438.

Hinge shall be non-handed with symmetrical template hole pattern and factory drilled. Hinge must accept a minimum of 21 fasteners on the door and 21 fasteners on the frame.

Each knuckle to be 2 inch, including split nylon bearing at each separation for quiet, smooth, self-lubricating operation.

Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours.

Provide machine screws for doors which have been reinforced to accept machine screws.

Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

Provide adjusting screws equal to Ives “Adjust-a-Stud” for continuous hinges specified as 705. Adjustment to be able to correct frame fit problems up to 3/8 inch.

2.3 FLUSH BOLTS AND DUST PROOF STRIKES

A. Acceptable manufacturers and respective catalog numbers:

		Ives	Door Controls	Hager
1.	Dust Proof Strike	DP2	80	280X
2.	Auto Flush Bolt (Metal Door)	FB31P	842	292D
3.	Auto Flush Bolt (Wood Door)	FB41P	942	291D

B. Unless otherwise specified, provide 12" rods for manual flush bolts for door 7'6" or less, 24" top rods for doors over 7'6" to 8'6".

C. Unless otherwise specified, provide doors over 8'6" with automatic top bolts.

D. Provide automatic flush bolts where required to maintain fire door listing and or egress requirements on pairs of doors.

E. All flush-bolt applications shall be UL listed to be installed with top flush-bolt only. Provide auxiliary fire bolt as required for fire rated openings where less bottom bolt has been specified.

F. Provide all bottom flush bolts with non-locking dust proof strikes

2.4 EXIT DEVICES

A. Acceptable manufacturers and respective catalog numbers:

		Von Duprin	Precision
1.	Wide Stile, Push Pad	98 / 99 Series	2000 Series
2.	Wide Stile, Electric Latch Retraction Series	QEL 98 / 99 Series	ELR-2000
3.	Lever Trim	996 Series	3900 Series
4.	Pull Trim	990 Series	1700A Series

B. Obtain exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.

C. All exit devices shall be equipped with a sound-dampening feature to reduce touch pad return noise.

D. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.
E. All exit devices shall be provided with flush end caps to reduce potential damage from impact.
F. All exit devices shall be provided with dead-locking latch bolts to insure security.
G. All exit devices shall be U.L. listed for accident hazard. Exit device for use on fire doors shall also be U.L. listed for fire exit hardware.
H. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series devices where optional strikes will not accommodate door and frame conditions.
I. Coordinate with related trades to insure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.
J. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR)
K. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.
L. Unless specific exit device dogging options are noted within hardware sets, provide dogging options as follows:
    1. Fire Rated devices: Dogging not permitted.
    2. Non-Rated Exit Only functions not equipped with outside trim or pull: Less Dogging.
    3. Non-Rated Classroom functions: Less Dogging.
    4. Non-Rated devices utilizing electric latch retraction or electrified outside trim: Less Dogging.
    5. All Other Non-Rated devices: Cylinder Dogging utilizing interchangeable core cylinders. Cylinder keyway shall match locksets furnished on this project.
M. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.
N. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.
O. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36" wide.

2.5 LOCKSETS AND LATCHSETS

Locksets and latchsets shall be heavy duty cylindrical type which meet the quality and design of those shown below, (match owner's existing keying system)

ACCEPTABLE MANUFACTURERS:

BRAND	SERIES	LEVER DESIGN
SCHLAGE	AL SERIES	NEPTUNE

Locksets, latchsets, trim and cylinders shall be the product of one manufacturer unless otherwise indicated above. Cylinders shall have 6 pin tumblers. Unless otherwise indicated, all locksets, deadlocks and latchsets shall have 2 3/4" backsets. Bolt throw on pairs of doors shall be not less than 5/8". Lever handle locksets and latchsets with base metal other than aluminum shall have U.L. required fire stop to prevent latchbolt from returning into the lock body during fire.

Provide wrought boxes and strikes with proper length to protect trim not to project more than 1/8" beyond trim, frame or inactive leaf. Where required, provide open back strike to allow practical and secure operation. Provide knurled knobs at doors to stairs other than exit stairs, loading platforms, boiler rooms, stages and doors to other hazardous locations.

2.6 PULLS, PUSH BARS, PUSH/PULL PLATES

Acceptable manufacturers and respective catalog numbers:

	Burns	Hager	Ives
1. Straight Pull (1" dia., 10" ctc)	26C	4J	8103EZ-0
2. Straight Pull (3/4" dia., 8" ctc)	25B	3G	8102-8
3. Offset Door Pull (1" dia., 10" ctc)	39C	12J	8190-0
4. Pull / Push-Bar (1" dia., 10" ctc Pull)	422 x 26C	153	9103EZ-0
5. Offset Pull / Push-Bar (1" dia., 10" ctc Pull)	422 x 39C	157	9190-0
6. Push Plate (.050 4"X 16")	54	30S 4 x 16	8200 4 x 16
7. Push Plate (.050 6"X 16")	56	30S 6 x 16	8200 6" X 16"
8. Pull Plate (1" dia., 10" ctc - .050" X 4" X 16")	5426C	34J 4 x 16	8303EZ-0 4" X 16"

A. Adjust dimensions of push plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, push plates shall be factory drilled for cylinders or other mortised hardware. All push plates shall be beveled 4 sides and counter sunk.

Where possible, provide back-to-back, and concealed mounting for pulls and push bars. Push bar length shall be 3" less door width, or center of stile to center of stile for stile & rail or full glass doors.

2.7 COORDINATORS

Acceptable manufacturers and respective catalog numbers:

	Ives	Door Controls	Hager
1. Bar Coordinator	COR x FL	600 x Filler	297D x 297F
2. Mounting Bracket	MB Series	AB, C Series	297 Series

Provide coordinators at all pairs of doors having automatic flush bolts and closers on the inactive leaf, and for pairs of doors having vertical rod/mortise exit device combinations with overlapping astragals.

Provide appropriate filler bars, closer mounting brackets, carry bars, and special top latch preparations as required by adjacent hardware.

2.8 DOOR CLOSERS

A. Obtain door closers from a single manufacturer.

B. Closers shall use high strength cast iron cylinders, forged main arms and 1 piece forged steel pistons.

C. Closers shall utilize a stable fluid withstanding temperature range of +120 degrees F to -30 degrees F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.

D. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch and backcheck.

E. Provide closers for all labeled doors. Provide closers with adjustable spring power. Size closers to insure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.

F. Install closers on the room side of corridor doors, stair side o f stairways and interior side of exterior doors.

G. Closers shall be furnished complete with all mounting brackets and cover plates as required by door and frame conditions and by adjacent hardware.

H. Pressure Relief Value, PRV, shall not be acceptable.

I. ACCEPTABLE MANUFACTURER -Modern surface type with cover.
(Prebid approval required for all others)

Brand	Series
LCN	4050/ 4050 EDA

2.9 EXIT DEVICES

A. All exit devices shall be U.L. listed for accident hazard. Exit devices for fire doors shall be listed for Fire Exit Hardware.

B. All exit devices shall be equipped with a sound-dampening feature to reduce touch pad return noise.

C. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.

D. All exit devices shall be provided with flush end caps to reduce potential damage from impact.

E. All exit devices shall be provided with dead-locking latchbolts to insure security.

F. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series where optional strikes will not accommodate door and frame conditions.

G. Coordinate with related trades to insure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.

H. Refer to hardware groups for exit device applications utilizing the option of: “less bottom rod and floor strike” (LBR)

I. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.

J. Use interchangeable core cylinders when used in conjunction with exit devices. Cylinder keyway shall match locksets furnished on this project.

K. Provide cylinder keyed dogging (interchangeable core) for all non-fire rated exit devices.

L. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.

M. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.

N. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36” wide.

O. Devices specified are designed for wide style doors. If door size will not allow for the wide style device, provide the appropriate device to fit the door specified.

P. Function numbers used in the groups of this specification are Falcon.

Q. Acceptable Manufacturers:

	FALCON
1. Wide Stile, Push Pad	25 Series

2.10 DOOR TRIM

A. Unless otherwise indicated, all push plates shall be 6" x 16" for flush doors and 4" x 16" for doors which will not accept 6" plates.

B. Unless otherwise indicated, all door pulls shall be 3/4" round material with 8" centers and 2 5/8" and 2 ½" projection. Concealed screw mounting shall be used whenever thru-bolt attachment would leave an exposed screw.

C. All kick plates stainless steel (color as indicated on finishes in 1.9) with 4 beveled edges. Width of kick plates and armor plates shall be 2" LDW on single doors and 1" LDW on pairs of doors. All kickplates shall be 10" high. Provide at push side.

2.11 KICK PLATES AND MOP PLATES

A. Furnish protective plates as specified in hardware groups.

B. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing.

D. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.

E. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

2.12 OVERHEAD STOPS

Acceptable manufacturers and respective catalog numbers:

	Glynn-Johnson	Rixson	Sargent
1. Heavy Duty Surface Mount	GJ900 Series	9 Series	590
2. Heavy Duty Concealed Mount	GJ100 Series	1 Series	690

Overhead stops (including slide block and end caps) shall be fabricated from metal.

Unless otherwise specified, furnish GJ900 series overhead stop for doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.

Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.

Provide special stop only (“SE” suffix) overhead stops when used in conjunction with electronic hold open closers.

Do not provide holder function for labeled doors.

2.13 WALL STOPS AND HOLDERS

Acceptable manufacturers and respective catalog numbers:

	Ives	Hager	Burns
1. Wrought Convex Wall Bumper	WS406CVX	232W	570
2. Wrought Concave Wall Bumper	WS406CCV	236W	575

Furnish a stop or holder for all doors. Furnish floor stops only where specifically specified.

Where wall stops are not applicable, furnish overhead stops.

Do not provide holder function for labeled doors.

2.14 WEATHERSTRIP, GASKETING

Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Weatherstrip	429	2891_PK	700NA	755
2. Adhesive Gasket	188	S88	5050	797
3. Mullion Seal/Silencer	8780	5110	5100N	
4. Meeting Edge Seals	8193	18041	9605	959
5. Automatic Door Bottom (HD Concealed) (When Sealing Against A Solid Surface)	360	434_RL	423N	430
6. Automatic Door Bottom (HD Concealed) (When Sealing Against Carpet)	360	434_NBL	683	943
7. Automatic Door Bottom	355	420APKL	320N	372A
8. Sweeps	8192	18061_NB	B606	964
9. Sweep w/ drip	8198	345_N	C627	354
10. Drip Cap	142	346	16	R201

Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

Provide weatherstripping all exterior doors and where specified.

Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.

Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

2.15 THRESHOLDS

Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Saddle Thresholds	8655	171	425	S205

Hardware supplier shall verify all finish floor conditions and coordinate proper threshold as required to insure a smooth transition between threshold and interior floor finish.

Threshold Types:

1. Unless otherwise specified, provide saddle threshold similar to Zero 8655 for all exterior openings with an interior floor finish less than or equal to 1/4" in height.
2. Unless otherwise specified, provide half saddle threshold similar to Zero 1674 for all exterior openings with an interior floor finish greater than 1/4" in height. Threshold height shall match thickness of interior floor finish.

2.16 ELECTRIC STRIKES

Acceptable manufacturers and respective catalog numbers:

	Von Duprin	Folger Adams
1. Type 1	6000 Series	300 Series

Provide electric strikes designed for use with the type of locks shown at each opening where specified.

Electric strikes shall be UL listed as Burglary-Resistant Electric Door Strikes and where required shall be UL listed as Electric Strike for Fire Doors.

Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.17 MAGNETIC LOCKS

Acceptable manufacturers and respective catalog numbers:

	Schlage Electronics
1. Direct Hold	M490 Series

Provide magnetic locks as specified, complete with mounting brackets and fasteners appropriate to the application. Direct Hold magnetic locks shall have a minimum of 1500 lbs holding force. Shear Locks shall have a minimum of 2700 lbs holding force.

Provide magnetic locks with integral magnetic bond sensor, time delay (1-90 Seconds) for re-locking, and LED status indicator as noted in hardware groups.

Provide regulated and filtered power supplies for magnetic locks by the same manufacturer.

2.18 POWER SUPPLIES

Provide quantities and types as specified in hardware sets. Shared power supplies will not be accepted without prior approval from the owner.

All power supplies shall have the following features:

1. 12/24 VDC Output, field selectable.
2. Class 2 Rated power limited output.
3. Universal 120-240 VAC input.
4. Low voltage DC, regulated and filtered.
5. Polarized connector for distribution boards.
6. Fused primary input.
7. AC input and DC output monitoring circuit w/LED indicators.
8. Cover mounted AC Input indication.
9. Tested and certified to meet UL294.
10. NEMA 1 enclosure.
11. Hinged cover w/lock down screws.
12. High voltage protective cover.

All power supplies shall incorporate fused distribution boards.

All electro-mechanical systems requiring fail safe circuits shall be capable of interfacing with the fire alarm system to cut power to appropriate system components. Unless already provided in another system component, all power supplies utilized in fail safe circuits shall include an integral relay which when connected to the N/C fire alarm contact will cut power to all openings connected to the individual power supply. Power supply, unless otherwise specified, will automatically reset itself when fire alarm relay returns to normal state following a fire alarm.

2.19 DOOR POSITION SWITCHES

Acceptable manufacturers and respective catalog numbers:

	Schlage Electronics	Sentrol	Sargent
1. Concealed (wood & hollow metal doors)	679 Series	1076W	3287
2. Concealed (aluminum doors)	7764	*****	****

2.20 FINISHES AND BASE MATERIALS

A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

	HARDWARE ITEM	BHMA FINISH AND BASE MATERIAL
1.	Butt Hinges: Exterior, or Non-Ferrous	631 (US19 – Matte Black)
2.	Butt Hinges: Interior	631 (US19 – Matte Black)
3.	Continuous Hinges	631 (US19 – Matte Black)
4.	Flush Bolts	631 (US19 – Matte Black)
5.	Exit Devices	631 (US19 – Matte Black)
6.	Locks and Latches	631 (US19 – Matte Black)
7.	Pulls and Push Plates/Bars	631 (US19 – Matte Black)
8.	Coordinators	631 (US19 – Matte Black)
9.	Closers	(Powder Coat Black)
10.	Protective Plates	631 (US19 – Matte Black)
11.	Overhead Stops	631 (US19 – Matte Black)
12.	Wall Stops and Holders	631 (US19 – Matte Black)
13.	Thresholds	628 (Mill Aluminum)
14.	Weather-strip, Sweeps Drip Caps	631 (US19 – Matte Black)
17.	Miscellaneous	631 (US19 – Matte Black)

2.21 KEYING

A. Provide all cylinders in keyways as required to accommodate owners existing Schlage key system.

B. Provide interchangeable cores for all locks and cylinders.

C. All locks under this section shall be keyed as directed by the owner to an existing Master Key System.

D. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.

E. Master keys, control keys, and change keys shall be delivered by registered mail to the owner. Construction keys shall be delivered to the contractor.

PART 3 – EXECUTION

3.1 EXAMINATION:

Prior to installation of hardware, installer shall examine door frame installation to insure frames have been set square and plumb. Installer shall examine doors, door frames and adjacent wall, floor and ceiling for conditions which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

3.2 INSTALLATION

A. Before hardware installation, general contractor shall coordinate a hardware installation seminar with 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices, continuous hinges and over head stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware. (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to

include use of installation manuals, hardware schedule, templates and physical products samples.

B. Install all hardware in accordance with the approved hardware schedule and manufacturer's instructions for proper installation and operation.

C. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.

E. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.

F. Shim doors as required to maintain proper operating clearance between door and frame.

G. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute.

H. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.

I. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.

J. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.

K. Install hardware on UL labeled openings in accordance with manufacturer’s requirements to maintain the label.

L. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.

M. Install hardware in accordance with supplemental “S” label instructions on all fire rated openings.

N. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework or equipment.

O. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.

P. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.

Q. Install door closers on corridor side of lobby doors, room side of corridors and stair side of stairways.

R. Adjust spring power of door closers to insure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to insure opening force does not exceed 5 lbs.

S. Adjust “sweep”, “latch”, and “back check” valves on all door closers to properly control door throughout the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building colde.

T. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel arm door closers, exit devices, etc., as required to accommodate weatherstripping.

U. Unless otherwise specified or detailed install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.

V. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water resistant seal.

W. Deliver to the Owner 1 complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.3 QUALITY ASSURANCE

A. After installation has been completed, the hardware supplier and manufacturer's representative for locksets, door closers, exit devices and overhead stops shall check the project and verify compliance with installation instructions, adjustment of all hardware items, and proper application according to the approved hardware schedule. Hardware supplier shall submit a list of all hardware that has not been installed correctly.

B. After installation has been completed, the hardware supplier and manufacturer's representative shall meet with the Owner to explain the functions, uses, adjustment and maintenance of each item.

C. Apply self-adhesive gasketing on frame stop at head and latch side and on rabbet of frame at hinge side.

3.4 ADJUSTMENT AND CLEANING

A. At final completion, and when HVAC equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. Lubricate moving parts with type lubrication recommended by the manufacturer.

B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective or inoperative shall be repaired or replaced.

HARDWARE GROUPS

1. The following schedule of hardware groups shall be considered a guide only and the supplier is cautioned to refer general conditions, special conditions, and the preamble to this section. It shall be the hardware suppliers responsibility to furnish all required hardware.
2. Refer to the door schedule for hardware group required for each opening.

3. *HARDWARE GROUP SUFFIXES NOTED ON SCHEDULES*:

"W" Furnish weatherstrip, sweep, and threshold as required. For exterior pairs, furnish astragal similar to Reese 964 each leaf.

"S" Furnish electric strike: Adams Rite 7100 series, or as required, matching latching mechanism application. (Von Duprin approved equal). Voltage to match Owner's Card Reader Security; continuous duty. Coordinate requirements with electrical. Provide transformer. Run #22 wire from electric strike to transformer, (power to transformer by electrical).

"K" Furnish electric keypad: Door-Gard212m mullion keypad system (800) 343-9502. Provide installation accessories appropriate for installation. Install to operate electric strike. Mount on door frame unless noted otherwise.

"D" Furnish door release button. Provide installation accessories appropriate for installation. Install in door frame at height approved by owner. Install to operate electric strike as directed by owner.

"A" Furnish exit alarm: Detex, surface mounted, battery powered.

HARDWARE GROUPS

GROUP 1 (Aluminum Entry)

All hardware shall be furnished by door supplier except cylinders as required. Verify quantity and type with door supplier.

GROUP 2 (Aluminum Entry)

All hardware shall be furnished by door supplier except cylinders as required. Verify quantity and type with door supplier.

GROUP 3 (Aluminum Entry)

All hardware shall be furnished by door supplier except cylinders as required. Verify quantity and type with door supplier.

GROUP 4 Interior stairwell door

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE	
B.	1 RIM EXIT DEVICE	CD-QM-98-L-711-3'-CYL-WD-S		VON
C.	1 IC CYLINDER	AS REQUIRED	SCH	
D.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN	
E.	1 WALL STOP	WS406	IVE	
F.	1 KICK PLATE	8400 10" X 2" LDW B4E	IVE	
G.	1 SET SEALS	188S	ZER	

GROUP 5 Interior Pair – Community Room

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE	
B.	1 VERT ROD EXIT DEVICE (active leaf)	CD-QM-98-L-711-3'-CYL-WD-P		VON
C	1 AUTOMATIC FLUSH BOLT (inactive leaf)			
D.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN	
E.	1 OH STOP	100S	GLY	
F.	1 KICK PLATE	8400 10" X 2" LDW B4E	IVE	
G.	COORDINATOR			
H.	ASTRAGAL			
I	1 SET SEALS	188S	ZER	

GROUP 6 Existing door

Each door shall have:

A.	1 SURFACE CLOSER	4050 SCUSH - 693	LCN

Remainder of exg hardware to remain

GROUP 7 Existing door

Each door shall have:

A.	1 VERT ROD EXIT DEVICE	CD-QM-98-27-711-3'-CYL-WD-S	VON
B.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN

Remove existing slide bolt, Remove existing interior pull handle. Remainder of exg hardware to remain

GROUP 8 New door

Each door shall have:

A.	1 VERT ROD EXIT DEVICE	CD-QM-98-27-NL-OP-711-3'-CYL-WD-S	VON
B.	HINGES	AS SPECIFIED	IVE
C.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN
D.	1 OH STOP	100S	GLY
E.	1 KICK PLATE	8400 10" X 2" LDW B4E	IVE

Reinstall existing salvaged pull from demo'd door on exterior side

GROUP 9 Existing door pair

Each door shall have:

A.	1 VERT ROD EXIT DEVICE	CD-QM-98-27-711-3'-CYL-WD-P	VON
B.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN

Remove existing slide bolts, Remove existing interior pull handle. Remainder of existing hardware to remain

GROUP 10 Existing door

Each door shall have:

A.	1 VERT ROD EXIT DEVICE	CD-QM-98-27-711-3'-CYL-WD-S	VON
B.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN

Remove existing electronic deadbolt. Remove existing interior pull handle. Remainder of existing hardware to remain. Provide cover plate as needed over removed deadbolt.

GROUP 11 Interior Pair – Gymnasium

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE
B.	1 VERT ROD EXIT DEVICE (active leaf)	CD-QM-98-NL-OP-711-3'-CYL-WD-P	VON
C	1 AUTOMATIC FLUSH BOLT (inactive leaf)		
D.	1 SURFACE CLOSER	4040XP SCUSH - 693	LCN
E.	1 OH STOP	100S	GLY
F.	1 KICK PLATE	8400 10" X 2" LDW B4E	IVE
G.	ASTRAGAL (install on inactive leaf)		
H	1 SET SEALS	188S	ZER

GROUP 12 Entrance/Office Lever

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE
B.	1 ENTRANCE LOCK	AL53 – 622 (ATH)	SCH
C.	1 SURFACE CLOSER	4040 SCUSH - 693	LCN
D.	1 KICK PLATE	8400 10” X 2” LDW B4E	IVE
E.	1 OH STOP	100S	GLY
F	1 SET SEALS	188S	ZER

GROUP 13 Existing office

Each door shall have:

A.	1 ENTRANCE LOCK	AL53 – 622 (ATH)	SCH
B.	1 SURFACE CLOSER	4040 SCUSH - 693	LCN
C.	1 OH STOP	100S	GLY
D	1 SET SEALS	188S	ZER

Remainder of exg hardware to remain

GROUP 14 Push/Pull

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE
B.	1 DOOR PULL, 1” ROUND	8103 10”	IVE
C.	1 PUSH PLATE	8200 4” x 16”	IVE
D.	1 DEADBOLT		
E.	1 SURFACE CLOSER	4040 SCUSH - 693	LCN
F.	1 KICK PLATE	8400 10” X 2” LDW B4E	IVE
G.	1 WALL STOP (men’s)	WS406*	IVE
H.	1 OH STOP (women’s)	100S	GLY

GROUP 15 Storeroom Lever

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE
B.	1 STOREROOM LOCK	AL80– 622 (ATH)	SCH
C.	1 SURFACE CLOSER	4040 SCUSH - 693	LCN
D.	1 KICK PLATE	8400 10” X 2” LDW B4E	IVE
E.	1 WALL STOP	WS406*	IVE
F	1 SET SEALS	188S	ZER

GROUP 16 Privacy Lever

Each door shall have:

A.	HINGES	AS SPECIFIED	IVE
B.	1 PRIVACY LOCK	AL40 – 622 (ATH)	SCH
C.	1 SURFACE CLOSER	4040 SCUSH - 693	LCN
D.	1 KICK PLATE	8400 10” X 2” LDW B4E	IVE
E.	1 WALL STOP	WS406*	IVE
F	1 SET SEALS	188S	ZER

*Note: Use overhead stop if WS406 is not applicable.

END OF SECTION 08 7100

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GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. Section Includes:
   1. Windows
   2. Glazing of aluminum framed entrances and storefronts
   3. Doors, except glass supplied in door units
   4. Borrowed lights

B. Related Sections:
   1. Division 07 Section “Joint Sealants” for glazing sealants
   2. Division 08 Section “Hollow Metal Doors and Frames”
   3. Division 08 Section “Aluminum Windows“

1.3 SUBMITTALS

A. Product Data: for each glass product and glazing material indicated

B. Product Certificates: For glass and glazing products, from manufacturer

C. Qualification Data: for installers

D. Shop Drawings: Glazing schedule listing glass types and thicknesses for each size opening and location.

E. Samples: required

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers who are certified under the National Glass Association’s Certified Glass Installer Program.

B. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

C. Source Limitations for Glass Types and Glazing Accessories: Obtain from a single source for all types

D. Glazing Publications: Comply with published recommendations
   1. AAMA Publications: AAMA GDSD-1 “Glass Designed for Sloped Glazing”
   2. IGMA Publication for Insulating Glass
   3. Reference Specification: "Glazing Manual", by Flat Glass Marketing Association.
   4. Materials: Conform in all respects to the "Safety Standard for Architectural Glazing Materials", 16CFR 1201, issued by the Consumer Product Safety Commission.

E. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer’s name, type of glass, thickness, and safety glazing standard with which glass complies.

F. Insulated-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.5 PRODUCT DELIVERY STORAGE AND HANDLING

A. Deliver Materials:

B. Store Materials: Store masonry units off the ground and keep them covered so they don't absorb rain, snow, or ground water

C. Handle Materials:

1. Handle glazing materials to avoid injury to persons and to avoid damage to materials or to work in place. Satisfactorily repair or remove and replace work that has been damaged.
2. All shall not be approved until substantial completion.
3. Protect glass from scratching, breaking, or other injury while storing, during installation, and until work is completed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers of Glass Product: subject to compliance with requirements, provide products by one of the following:

1. Old Castle
2. Pilkington North America
3. PPG Industries, Inc
4. Viracon

2.2 GLASS PRODUCTS, GENERAL

A. Thickness: where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum glass thickness for Exterior Lites: not less than 6.0 mm
2. Provide same thickness for each tint color indicated throughout Project

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass. Where heat strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-reated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float-glass

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on prodecures indicated below.

1. For monolithic-glass lites, properties based on units with lites 6.0 mm thick
2. For laminated-glass lites, properties based on products of construction indicated
3. For insulating-glass units, properties are gasec on units of thickness indicated for overall thicknesses indicated for overall unit and for each lite.
4. U-Factors: center of glazing values, according to NFRC 100
5. Visible Reflectance: center of glazing values according to NFRC 300

2.3 GLASS PRODUCTS

A. 1/4 inch tempered by PPG or approved equal.

B. Verify to match previously replaced existing windows on north side of gym. Solarban 60 on Solargray Low-E #2, 1/2 inch air space (90% Argon fill), and inside light of 1/4 inch thick, tempered clear glass. (Tempered glass may be deleted where allowed by code.) Provide Solargray tint at storefront glazing at entry Vestibules storefront. Must meet u-factor for

fixed glazing of 0.36 for vertical fenestration, (0.77 for entrance doors) and SHGC of 0.40. Submit samples for approval.

C. Glazing –
   1. Neoprene setting and space blocks.
   2. Extruded polybuthene tape sealant such as Parlfex Tape by Parr, Inc., or Tremco 440 by Tremco Co.
   3. Sealant – Dymeric by Tremco Manufacturing Co., or Uni-Par-Seal by Parr, Inc.
   4. Glazing compound – Tremco “Tremco, Tremglaze” or approved equal, olcoresinous compound.
   5. Follow manufacturer’s recommendations for glazing storefront systems specified in Division 08 Section “Aluminum Framed Entrances and Storefronts”.
   6. Note: all insulated glass units low E (on #3 surface) with argon gas between lites.

D. Laminated safety glass may be substituted for tempered, where allowed by code or mfr.

2.4 Glazing Size and Location – Refer to drawings for openings to be glazed and the glass to be used. Match existing building glazing where indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Check that glazing channels are free of burrs, irregularities, and debris.
   1. Check that glass is free of edge damage or face imperfections.
   2. Do not proceed with installation until conditions are satisfactory.

3.2 PREPARATION

A. Field Measurement
   1. Measure size of actual frame to receive glass. Sizes shown on the drawings are approximate, to be used for estimating only.
   2. Compute actual glass size, allowing for edge clearances.
   3. Preparation of Surfaces
      a. Remove protective coatings from surfaces to be glazed.
      b. Clean glass and glazing surfaces to remove dust, oil and contaminants.

3.3 INSTALLATION

A. Install glass in accordance with glass manufacturer's recommended instructions.
   1. Provide weathertight installation.
   2. Provide fire-rated assemblies where required.
   3. Provide insulated glass units at exterior locations
   4. Provide tempered glass where required by building code or glass area
   5. Provide laminated safety glass where required by building code.

B. Set all glazing in the best possible manner and in such a way that there will be equal bearing the entire width of the pane.

C. All glazing setting blocks, spacers, tape, etc. shall be set in accordance with the manufacturer’s recommendations.

D. No glazing shall be done when the air temperature is less than 40° F nor when frost, ice, or moisture is on the glazing surfaces.

E. Provide a seal bead of sealant in bottom corners of all wood frames to insure against leaks.

F. At the completion of the work of the section, this contractor shall remove from the building and premises all rubbish and accumulated matters of whatever nature not caused by other trades and shall leave work in a clean, orderly, acceptable condition.

G. Install temporary coverings necessary to prevent damage to finished surfaces during construction.

3.5 CLEANING

A. Remove excess glazing compound from installed glass.

B. Remove labels from glass surface as soon as installed.

C. Wash and polish both faces of glass.

D. Remove debris from work site.

3.6 PROTECTION

A. Attach crossed streamers away from glass face.

B. Do not apply markers to glass surface.

C. Replace damaged glass.

END OF SECTION 08 8000

TERRAZZO RESTORATION

PART 1 – GENERAL

1.01 SECTION INCLUDES
- A. Refinishing terrazzo floors.
- B. Provide all labor, material, and equipment necessary to complete the following terrazzo repair work
- C. Preparation of all surfaces to receive patching compound
- D. Repairs to delaminated areas
- E. Repair of cracks (as per NTMA recommendations)
- F. Placement of patching compounds/terrazzo matrix
- G. Finish and curing of terrazzo

1.02 REFERENCE STANDARDS
- A. NTMA – Terrazzo Specifications; The National Terrazzo and Mosaic Association, Inc.; current edition located at www.ntma.com

1.03 SUBMITTALS
- A. Product Data: Provide manufacturers technical data for sealer and cleaner and grout.
- B. Cleaning products to be used and Terrazzo Maintenance Data/Protocols for facility managers
- C. Submit letter clearly identifying the terrazzo system (Epoxy, Cement, etc) and that the products are suitable/compatible

1.04 QUALITY ASSURANCE
- A. Installer Qualifications: Company specializing in performing the work of this section with not fewer than 5 years of documented experience.
  1. Installer shall be a contractor member of NTMA in good standing and shall perform all work in accordance with NTMA standards
  2. Use only skilled journeyman who are familiar and experienced with the materials and methods specified shall be used for terrazzo restoration/refinishing.
  3. Crack Repair: Prepare a sample area for each type of crack repair required (Hairline cracks 1/64” to 1/16" in size; Cracks and voids larger than 1/8”) Repair shall demonstrate methods and quality of workmanship of crack repair.
  4. Patching: Prepare on-floor, a sample of patching. Patch shall demonstrate methods and quality of workmanship of patch repair

PART 2 - PRODUCTS

2.01 MATERIALS
- A. Cleaner: Potable water, free of iron, all cleaners (optional) must be pH neutral
- B. Sealer: Liquid type to completely seal matrix surface; not detrimental to terrazzo components.
- C. Grout: Color to match existing matrix.
- D. Matrix: Pigmented epoxy to match sample submitted
- E. Aggregates: Aggregates to match architects approved sample

2.02 EQUIPMENT

A. All work shall be executed with conventional terrazzo grinding equipment according to NTMA published trade practice.

PART 3 - EXECUTION

3.01 GENERAL
- A. Perform work in accordance with NTMA recommendations as posted on the NTMA website (www.ntma.com)

3.02 PREPARATION
- A. Cover and protect all adjacent finished surfaces during restoration process.

3.03 CRACK REPAIR
- A. Determination
  1. The owner and contractor shall walk the entire floor and identify cracks and agree on
     a. NA (No Action) RC (Repair Crack) or RT (Replace Terrazzo)
     b. Hairline cracks are classified as less than 1/32” (0.030)
     c. Replacement (RT) shall be from architectural break to architectural break
- B. RC - Repair Crack
  1. Clean crack of loose material, dirt or sealer
  2. Fill with resin/to match existing. Use aggregate in the crack if crack is wider than ¼ inch.
- C. RT- Replace Terrazzo (if repair is not to architectural break or existing terrazzo divider strip, the joining edge shall be a saw tooth (jagged edge)
  1. Remove areas to be replaced
  2. Clean area and prepare concrete for new terrazzo
  3. Repair concrete, fill cracks in concrete substrate as needed. Fill cracks in concrete with hardening epoxy
     Optional upgrade: Employ the use of a mesh (isolation membrane) to cover crack with liquid applied membrane (epoxy systems only)
  4. Fill area with epoxy or cement /cement matrix and approved aggregate mixture/blend

3.04 INITIAL GRINDING
- A. Wet or dry grind with appropriate medium diamonds/Stones

3.05 GROUTING
- A. Cleanse floor with clean water and rinse. Wet grind with 50 or higher abrasive grit medium diamonds.
- B. Remove excess water and machine or hand grout with cement or epoxy material to fill as needed.

3.06 CURING GROUT
- A. Allow grout to cure a minimum of 12 hours. Maintain ambient air temperature between 70°F (21°C) and 80°F (27°C)

3.07 FINE (Final) GRINDING
- A. Grind with 120 grit carborundum or 200 grit resin bond diamond until grout has been removed from the terrazzo surface.

3.08 CLEANING AND SEALING:
- A. Rinse with clean water and allow too thoroughly dry.

B. Seal: Apply sealer per sealer manufacturer's written directions

C. Remove protection and clean any adjacent surfaces effected by the refinishing process.

3.09 PROTECTION

A. General Contractor shall protect the finish floor from all site activity until Substantial Completion.

END OF SECTION 09 1060

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PLASTER RESTORATION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for restoration of decorative plaster ceiling and wall surfaces, including the following:

1. Grand Lobby Loggia and Corridors 102, 201, 202 and Historic Stairs 5, 6, 7, 8 and 9:
   a. Groin Vaulted Plaster Ceilings:
      1) Encapsulate lead based paint as required and repaint the ceiling as specified in Section 09 91 00.
      2) Repair damage to plaster edge molding as required.
      3) Repair edge stenciling. Repair will consist of cleaning and infill painting where required by a specialty paint finish contractor.
2. Elevator Lobbies Floors 3 through 8 Rooms 301, 401, 501, 601, 701 and 801:
   a. Utilize existing mold of plaster cove made by the Soft Demolition Contractor prior to removal of the existing plaster cove.
   b. Replace existing plaster walls, ceiling and cove molding with new plaster finishes as required to match the original plaster finish.
3. Historic Courtroom Room 816 and Jury Room 819:
   a. Repair existing plaster walls and ceilings, cast plaster brackets and plaster cove moldings as required.

1.02 SUBMITTALS

A. Product Data: Manufacturer's technical data for each product to be used, including recommendations for application and use.

B. Samples: Furnish the following for verification purposes prior to mock-up erection:
   1. Patching material for repairing damaged plaster.

1.03 QUALITY ASSURANCE

A. Restoration Specialist: Firm having minimum 5-years experience in comparable historic restoration Projects, employing personnel skilled in the restoration and operations specified.

B. Field Constructed Mock-Up: Prior to start of work, prepare a mock-up of plaster repair where directed by the County's Representative. Obtain County's Representative's approval of visual qualities before proceeding with the work.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original and unopened containers and packaging, bearing labels indicating type and names of products and manufacturers.

B. Protect materials during storage and construction from wetting by rain or ground water, and from staining or intermixture with earth and other types of materials.

C. Protect materials from deterioration by moisture and temperature.
   1. Store in a dry location or in waterproof containers.
   2. Keep containers tightly closed and away from open flames.
   3. Comply with manufacturer's recommendations for storage temperature requirements.

1.05 PROJECT CONDITIONS

A. Prevent plaster materials from staining face of surrounding surfaces. Remove immediately from exposed surfaces.

PART 2 – PRODUCTS

2.01 PLASTER MATERIALS

A. Provide plaster materials as required to match the appearance of existing decorative plaster.

PART 3 – EXECUTION

3.01 REPAIRING PLASTER WALLS AND CEILINGS

A. Filling Cracks:
   1. For cracks that reopen with temperature and humidity changes, the crack shall be widened with a sharp, pointed tool and then filled.
   2. For persistent cracks, bridge the crack with fiberglass mesh tape pressed into the patching material. After the first application of a quick setting joint compound dries, a second coat shall cover the tape, feathering at the edges. Apply a third coat to even out the surface and follow by a light sanding.
   3. Large cracks due to structural movement shall be repaired after repairs to the structural system have been made. The plaster on each side of the crack shall be removed to a width of approximately 6-inches down to the lath. Clean out debris and apply metal lath to the cleaned area leaving the existing wood lath in place. Patch the crack with an appropriate plaster in three layers.

B. Replacing Delaminated Areas of the Finish Coat: Paint a liquid plaster bonding agent on the areas of basecoat plaster that will be re-plastered with a new lime finish coat.

C. Patching Holes in Walls:
   1. Repair small holes less than 4-inches in diameter in two applications. Trowel-apply a layer of base coat plaster and scrape back below the level of the existing plaster. When the base coat has set but before it dries, apply more plaster to create a smooth, level surface.
   2. For larger holes where three coats of plaster are damaged or missing down to the lath, remove the old plaster and re-attach any loose lath. Apply plaster in 3 layers lapping each new layer over the old plaster so that old and new are evenly joined.
   3. If a patch is made in a plaster wall that is slightly wavy, the contour of the patch shall conform to the irregularities of the existing work.

D. Patching Holes in Ceilings: Examine the plaster around the loose plaster. If the surrounding areas are in reasonably good condition, the loose plaster can be re-attached to the lath using flathead wood screws and plaster washers. To patch a hole in the ceiling plaster, fasten metal lath over the wood lath and fill the hole with successive layers of plaster.

E. Establishing New Plaster Keys:
   1. If the back of the ceiling lath is accessible, small areas of bowed out plaster can be pushed back against the lath.

2. After dampening the old lath and coating the damaged area with a bonding agent, a liquid plaster mix with glue size retardant added shall be applied to the backs of the lath and worked into the voids between the faces of the lath and the back of the plaster. While the first layer is still damp, plastersoaked strips of jute scrim shall be laid across the backs of the lath and pressed firmly into the first layer as reinforcement.
3. Loose, damaged plaster can also be re-keyed when the goal is to conserve decorative surfaces or wallpaper.

F. Plaster Patching Materials: Plaster shall be determined by the plasterer.

END OF SECTION 09 2099

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GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY
- A. This section includes the following:
  1. Interior gypsum wallboard
  2. Rated walls and enclosures
  3. Soffits and bulkheads
  4. Non-load-bearing steel stud framing
  5. Tile backing panels
  6. Trim accessories and joint treatments

1.3 RELATED SECTIONS
- A. Division 6 Section “Miscellaneous Rough Carpentry” for blocking
- B. Division 7 Section “Thermal Insulation” for insulation and vapor retarder installed in gypsum board assemblies
- C. Division 7 Section “Air and Weather Barriers” for vapor barrier installed in gypsum board assemblies
- D. Division 7 Section “Penetration Firestopping”
- E. Division 7 Section “Joint Sealants”
- F. Division 9 Section “Tiling” for backer units installed as substrates for ceramic or porcelain tile

1.4 DEFINITIONS
- A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defines in the Section or in other referenced standards

1.5 SUBMITTALS
- A. Product Data: for each type of product indicated
- B. Shop Drawings: show locations, fabrication, and installation of control and expansion joints, including plans, elevations, sections, details of components and attachments to other units of Work.
- C. Samples: for textured finishes as indicated

1.6 QUALITY ASSURANCE
- A. Referenced Specifications: The more stringent requirement of this section or referenced specification applies.
  1. "Using Gypsum Board for Walls and Ceilings", The Gypsum Association - GA-201-85.
  2. "Recommended Specifications for the Application and Finishing Gypsum Boards", The Gypsum Association - GA-216.
  3. Fire-Test-Response Characteristics: provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by and independent testing agency; for fire-resistance-rated assemblies as indicated on drawings
  4. STC-Rated Assemblies; for STC-rated assemblies, provide materials and

construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

B. Mock-ups: Coordinate work with other trades to create a complete and representative wall assembly including each exterior finish material, air and weather barrier, insulation, sheathing, vapor retarder and metal framing and all flashings, sealants and accessories as directed by the Construction Manager.
   1. Build mock ups of typical walls:
      a. Brick showing all types of masonry. Include one typical window assembly.
      b. Brick with aluminum composite panel above.

1.7 DELIVERY, STORAGE AND HANDLING
   A. Deliver materials to the project site with manufacturer's labels intact and legible.
   B. Handle materials with care to prevent damage.
   C. Storage
      1. Store materials inside under cover, stack flat, off floor.
      2. Back wallboard so that long lengths are not over short lengths.
      3. Void overloading floor system.
      4. Store adhesives in dry area, provide protection against freezing at all times.

1.8 PROJECT CONDITIONS
   A. Environmental Limitations: Comply with ASTM C 840 requirements or during cold weather, maintain temperature range between 55 degrees F. to 70 degrees F. for 24 hours before, during, and after gypsum board and joint treatment applications (whichever is more stringent.)
   B. Ventilation
      1. Provide ventilation during and following adhesive and joint treatment applications.
      2. Use temporary air circulators in enclosed areas lacking natural ventilation.
      3. Protect installed materials from drafts during hot, dry weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS
   A. Available Manufacturers: subject to compliance with requirements, manufacturers offering the products that may be incorporated into the Work include, but are not limited to following:
      1. Steel Framing and Furring:
         a. Clark Steel Framing Systems.
         b. Custom Stud.
         c. Dale Industries, Inc. – Dale / Incor
         d. Dietrich Industries, Inc.
         e. MarinoWare, Division of Ware Ind.
         f. National Gypsum Company.
         g. Scafco Corporation.
         h. Unimast, Inc.
         i. Western Metal Lath & Steel Framing Systems
      2. Gypsum Board and Related Products:
         a. Georgia Pacific Gypsum Corp.

b. American Gypsum Co
c. Certainteed Corp.
d. Lafarge North America, Inc.
e. National Gypsum Company.
f. United States Gypsum Co.

2.2 MATERIALS

A. Interior gypsum wallboard
1. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
2. Standard Gypsum Wallboard: ASTM C 1396, standard use gypsum panels
a. Thickness: 5/8 inch or as otherwise indicated
b. Long Edges: Tapered
c. Location: All wall locations
3. Sag-Resistant Gypsum Wallboard:
a. Thickness 5/8-inch thick or as otherwise indicated
b. Long Edges: tapered
c. Location: All Ceiling or Soffit surfaces
4. Exterior Gypsum Sheathing:
a. Thickness 5/8” or as indicated
b. Dens-Glass Sheathing by G-P Gypsum
5 Tile Backing Panels:
a. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
b. Wet Walls Behind Tile:
1) Dens Shield- tile backer board
2) Glas-Mat- interior gypsum board
3) approved equal
c. Dry Walls Behind Tile: 5/8-inch thick.
1) Gold Bond – XP Gypsum Board by National Gypsum Company
2) Dens-Shield – tile backer board
3) Glas-Mat- interior gypsum board
4) or approved equal

B. Trim accessories
1. Interior Trim: ASTM C 1047
a. Material: Galvanized or aluminum-coated steel sheet or rolled zinc
b. Shapes:
1) Cornerbead: use at outside corners
2) LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges
3) U-Bead: J-shaped; exposed short flange does not receive joint compound; use where indicated
4) Expansion (Control) Joint: Use where indicated

C. Joint treatment materials
1, General: Comply with ASTM C 475
2. Joint Tape: ASTM C 840
a. Interior Gypsum Wallboard: Paper

b. Tile Backing Panels: As recommended by panel manufacturer

3. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive costs
   a. Pre-filling: at open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound
   b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
   c. Fill Coat: For second coat, use drying-type, all-purpose compound
   d. Finish Cost: For third coat, use drying-type, all-purpose compound
4. Joint Compound for Tile Backing Panels
   a. Glas-Mat, Water-Resistant Backing Panel: as recommended by manufacturer.

D. Acoustical sealant
1. Available Sealant Products for Exposed and Concealed Joints
   a. Pecroa Corp: AC-20 FTR Acoustical and Insulation Sealant
   b. United States Gypsum Co. SHEETROCK Acoustical Sealant
2. Available Sealant Products for Concealed Joints
   a. Ohio Sealants, Inc. Pro-Series SC-170; Rubber Base Sound Sealant
   b. Pecora Corp; BA-98
   c. Tremco, Inc; Tremco Acoustical Sealant
3. Acoustical Sealant for Exposed and Concealed Joints: non-sag, paintable, non-staining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90
4. Acoustical Sealant for Concealed Joints: Nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

E. Non-load bearing steel partition and soffit framing
1. Components, General:
   a. Comply with ASTM C 754 for conditions indicated
   b. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/ A 653M, G40 for hot-dip galvanized zinc coating
2. Steel Studs and Runners: ASTM C 645
   a. Use 25-gage for partitions up to 12'-0" high, use 20-gage or greater (as required) for partitions over 12'-0" high.
   b. Depth: 1 -5/8 inches; 2-1/2 inches; 3-5/8 inches; 6 inches; and 8 inches as noted
   c. Use 20-gage studs at door jambs, head.
   d. Use 25-gage "z" furring strips.
3. Slip-Type Head Joints: Where indicated, provide one of the following
   a. Single Long-Leg Runner System: ASTM C 645
   b. Double-Runner System: ASTM C 645
   c. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior framing resulting from deflection of

structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

Available Products:

1) Delta Star Inc; Superior Metal Trim; Superior Flex Track System (SFT)
2) Metal-Lite Inc.; Slotted Track
3) Steel Network Inc.
4) USG

4. Proprietary Fire-Stop Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   a. Available Product: Metal-Lite, Inc.: The System
5. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated
   a. Minimum Base Metal Thickness: As indicated
6. Fasteners for Metal Framing: of Type, material, size, corrosion resistance, holding power and other properties required to fasten steel members to substrates.
7. Z-Shaped Furring: with slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inches, minimum bare-metal thickness of 0.0179 inch, and depth required to fit insulation thickness.

F. Auxiliary materials
   1. General; provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations
   2. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate
   3. Steel Drill Screws: ASTM C 1002, unless otherwise indicated
      a. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick
      b. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer
   4. Isolation Strip at Exterior Walls
      a. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated
      b. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, width to suit steel stud size.
   5. Sound Attenuation Blanket: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass
      a. Fire-Resistance-Rated Assemblies: comply with mineral-fiber requirements of assembly

PART 3 EXECUTION

3. 1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior walls.

B. Install studs so flanges within framing system point in same direction

1. Space studs as follows:
    a. Single-Layer Application: 16 inches o.c., unless otherwise indicated
    b. Multi-Layer Application: 16 inches o.c., unless otherwise indicated
    c. Tile backing panels: 16 inches o.c., unless otherwise indicated

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finishes assemblies
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    a. Install two studs at each jamb, unless otherwise indicated
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2 inch clearance from jamb stud to allow for installation of control joint in finishes assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated

D. Direct Furring:

1. Screw to framing
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment or power-driven fasteners spaced at 24 inches o.c.

E. Z-Furring Members:

1. Erect insulation (from Division 07) vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry

attachment or power-driven fasteners spaced at 24 inches o.c.

3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.3 APPLYING AND FINISHING PANELS, GENERAL

A. Follow Gypsum Association's recommendations for installation procedures: ASTM C 840 and GA-216

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Apply first to ceilings then to walls. Minimize the number of abutting end joints and avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partition. Do not make joints other than control joints at corners of framed openings.

F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Form control and expansion joints with space between edges of adjoining panels.

I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.) except in chases braced internally.

J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4 to 1/2 inch wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

K. Floating Construction: Where feasible, including where recommended in writing by manufacturer, install gypsum panels over framing, with floating internal corner construction.

L. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer’s written recommendations.

3.4 METHODS OF GYPSUM DRYWALL APPLICATION

A. Single-layer Application: Install gypsum wallboard as follows:

1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
3. On partitions/walls 8’-1” or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.

B. Wall Tile Base: Where drywall is base for thin-set ceramic tile and similar rigid applied wall finishes, install gypsum backing board.
   1. In “dry” areas install gypsum backing board or wallboard with tapered edges taped and finished to produce a flat surface.
   2. At showers, tubs and similar “wet” areas, install water-resistant backing boards to comply with ASTM C 840 and recommendations of gypsum board manufacturer.

C Double-Layer Application: Install gypsum backing board for base layer and gypsum wallboard for face layer.
   1. On partition/walls apply base layer and face layers vertically (parallel to framing) with joints of base layer over supports and face layer joints offset at least 10” with base layer joints.

D. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
   1. Fasten with screws.

E. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
   1. Fasten both base layers and face layers separately to supports with screws.

F. Direct-Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer’s recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.5 INSTALLATION OF DRYWALL TRIM ACCESSORIES

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer’s recommendations. Clinch on fastening systems will not be allowed.

B. Install metal corner beads at external corners.

C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed for semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound. Edge trim items which have an exposed flange after taping and sanding operations will not be allowed.
   1. Install “LC” bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
   2. Install “LK” bead where substrate is kerfed to receive long flange of trim.
   3. Install “L” bead where edge trim can only be installed after gypsum board is installed.

D. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual affect.

3.6 INSTALLATION OF DRYWALL FINISH

A. General: Apply treatment at gypsum board joints (both directions), flanges of corner bead, edge trim, and control joints; penetrations; fasteners heads, surface defects, and elsewhere as required to prepare work for decoration.

B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

D. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat (Level 4 finish): (NOTE: provide skim coat over entire surface, smooth and free of tool marks and ridges, where indicated on plans for a level 5 finish)
   1. Embedding and First Coat: Setting-Type Joint Compound.
   2. Fill (second) Coat: Setting-Type Joint Compound.
   3. Fill (Third) Coat: Ready-mix drying type all-purpose or topping compound.

E. Water-Resistant Gypsum Board Base for Ceramic Tile or Manufactured Tub and Shower Enclosures: Finish joints between water-resistant backing board with tape and setting-type joint compound to comply with gypsum board manufacturer's recommendations and installation standards referenced in Division 09 Section "Tile".

F. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

G. Gypsum board ceilings to receive "light orange peel" finish texture. Gypsum board walls to receive "light orange peel" finish texture (VERIFY WITH OWNER)

3.7 PROTECTION OF WORK

A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall work being without damage or deterioration at time work is accepted.

END OF SECTION 09 2216

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TILING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

B. Related Sections: The following sections contain requirements that relate to this Section:

1. Division 03 Section “Cast in Place Concrete”
2. Division 09 Section “Gypsum Board Assemblies” for wall finishes specified for tile substrates.
2. Division 07 Section “Joint Sealers” for sealing of expansion, contraction, control, and isolation joints in tile surface.

1.2 SUMMARY

A. This Section includes the following:

1. Ceramic wall tile.
2. Porcelain floor tile.
3. Schluter – outside corners, and floor tile cove to base
4. Solid Surface Thresholds at tile to tile transitions

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product Data: Submit manufacturer’s technical information and installation instructions for materials required, except bulk materials.

C. Shop Drawings indicating tile patterns and locations and widths of expansion, contraction, control, and expansion joints in tile substrates and finished tile surfaces.

1. Locate precisely each joint and crack in tile substrates by measuring, record measurements on shop drawings, and coordinate them with tile joint locations, in consultation with Architect.

D. Samples for Initial Selection Purposes in form of manufacturer’s color charts consisting of actual tiles or sections of tiles showing full range of colors, textures and patterns available for each type and composition of tile indicated. Include samples of grout and accessories involving color selection.

E. Samples for Verification Purposes of each item listed below, prepared on samples of size and construction indicated, products involve color and texture variations, in sets showing full range of variations expected.

1. Each type and composition of tile and for each color and texture required, at least 12-inches square, mounted on plywood or hardboard backing and grouted.
2. Full size samples for each type of trim, accessory and for each color required.
3. Stone thresholds in 6-inch lengths.
4. Metal Edge strips in 6-inch lengths.

F. Master Grade Certification for each shipment, type, and composition of tile, signed by manufacturer and Installer.

G. Material Test Reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of tile and tile setting grouting products with requirements indicated.

H. Qualification data for firms and persons specified in “Quality Assurance” article to demonstrate their capabilities and experience. Include list of completed project with project names, addresses, names of Architects and Owners, plus other information specified.

1.4. QUALITY ASSURANCE

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer’s instructions, site conditions, or applicable codes and standards; request clarification from the Architect before proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Single-Source Responsibility for Tile: Obtain each color, grade, finish, type composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

C. Single-Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

D. Installer Qualifications: Engage an experienced Installer who has successfully completed tile installation similar in materials, design, and extent to that indicated for Project.

E. Field-Constructed Mock-Up: Before installing tile, erect mock-ups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate mock-ups on site in location and size indicated or, if not indicated, as directed by Architect.
2. Erect mock-ups in presence of Architect.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain the Architect’s acceptance of mock-ups before the start of final unit of work.
5. Retain and maintain mock-ups during construction in undisturbed condition as a standard for judging completed unit of work.
    a. Accepted mock-ups in undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

F. Pre-installation Conference: conduct conference at Project site to comply with requirements of Division 01 Section “Project Meetings”.

1.5 DELIVER, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If despite these precautions

coating does contact bonding surfaces of the tile, remove coating from bonding surfaces of the tile before setting tile.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.

C. Maintain temperatures at 50°F (10°C) or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

1.7 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials that match products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size.

PART 2 – PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.

1. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.

B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.

C. Colors, Textures and Patterns: Where manufacturer's standard products are indicated for tile, grout and other products requiring selection of colors, surface textures or other appearance characteristics, provide specific products or materials complying with the following requirements:

1. Provide selections made by Architect from manufacturer's full range of standard colors, textures, and patterns for products of type indicated.
2. Provide tile trim and accessories which match color and finish of adjoining flat tile.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.

E. Mounting: Where factory-mounted tile is required provide back- or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.

1. Where tile is indicated for installation in swimming pools, on exteriors or in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies that this type of mounting is suitable for these kinds of use and has been successfully used on other projects.

F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating them with

a continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Glazed Ceramic Wall Tile CWT-1: SHAW Floors Stewart Color 100 WHITE
Provide flat tile complying with the following requirements:
1. Nominal Facial Dimensions: 4-inches x 16-inches (308TS)
2. Nominal Thickness: 1/4 inch
3. Surface Finish: Gloss
4. Surface Texture: Solid Color
5. Shade Variation: V1 Low
6. Water Absorption: >3%
7. Mounting: Latex modified thin-set
8. Grout: Hydroment- color to be selected from full range of selections

B. Glazed Ceramic Wall Tile CWT-2: SHAW Floors Stewart Color 500 GREY
Provide flat tile complying with the following requirements:
1. Nominal Facial Dimensions: 4-inches x 16-inches (308TS)
2. Nominal Thickness: 1/4 inch
3. Surface Finish: Gloss
4. Surface Texture: Solid Color
5. Shade Variation: V1 Low
6. Water Absorption: >3%
7. Mounting: Latex modified thin-set
8. Grout: Hydroment- color to be selected from full range of selections.

C. Porcelain Floor Tile: PFT-1 TRENDS in Ceramic Da Vinci Renaissance Honed V2
Provide factory-mounted flat tile complying with the following requirements:
1. Composition: Glazed Porcelain
2. Nominal Facial Dimensions: 12-inches x 24-inches
3. Nominal Thickness: 1/3 inch / 8.0 mm
4. Use: qualifies for commercial use and floor installation
5. Grout: Hydroment, color to be selected from full range of selections.

D. Trim Units: Schluter Systems
Provide tile trim units to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
2. Shapes: As follows, selected from manufacturer’s standard shapes:
   a. Cove Base for Thinset Mortar Installations: DILEX-HKW anodized aluminum; black
   b. External Corners for Thinset Installations: JOLLY coordinate with anodized aluminum & tile colors; white, black and grey
   c. Internal Corners: Field-butted square corners, caulk to match grout color

2.3 SETTING MATERIALS

A. Latex-Portland Cement Mortar (thin set): ANSI A118.4, composition as follows:
1. Latex additive (water emulsion) of type described below, serving as replacement for part or all of gauging water, added at job-site with dry grout mixture, with type of latex and dry grout mix as follows:
   a. Latex Additive: Manufacturer’s standard.

2. Dry Grout Mixture: Commercial Portland cement specified or supplied by latex additive manufacturer.
    a. Application: Use commercial Portland cement grout combined with latex additive for grouting joints in floor tile unless otherwise indicated.

2.4 GROUT MATERIALS, type shall be as recommended by the grout manufacturer for the specific type of tile and method of installation. Color shall be as selected from the manufacturer's standard colors.

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.

B. Standard Cement Grout: ANSI A118.6.
    1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following.
        a. MAPEI Corporaton.
        b. Hydroment.

2.5 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with requirements of Divison-7 Section "Joint Sealers", including ASTM C920 as referenced by Type, Grade, Class and Uses.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. One-Part Mildew Resistant Silicone Sealant: Type S; Grade NS; Class 25; Uses NT, G, A, and as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

D. Products: Subject to compliance with requirements, provide one of the following:
    1. One-Part Mildew-Resistant Silicone Sealant:
        a. "Dow Corning 786"; Dow Corning Corp.
        b. "SCS 1702"' General Electric Co.
        c. #345 White"; Pecora Corp.
        d. "Proglaze White"'; Tremco Corp.

2.6 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with requirements of referenced standards and manufacturers for accurately proportioning of materials, water or additive content, mixing equipment and mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

2.7 SOLID SURFACE THRESHOLDS: SST-1 Corian

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
    1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Description:
    1. Material: Corian Deep Espresso

2. Size 4” wide by 1/2 inch thick by fill width transition strips between different floor finishes.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas where tile will be installed, with Installer pre-compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
   1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
   2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under “American National Standard Specifications for the Installation of Ceramic Tile” that apply to type of setting and grouting materials and methods indicated.

B. TCA Installation Guidelines: TCA “Handbook for Ceramic Tile Installation”; comply with TCA installation methods indicated.

C. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.

E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.
   1. For tile mounted in sheets make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated. Do not saw cut joints after installation of tiles.
   1. Locate joints in tile surfaces directly above joints in concrete substrates.

2. Prepare joints and apply sealants to comply with requirements of Division-7 Section “Joint Sealers.”

H. Grout tile to comply with the requirements of the following installation standards:

1. For ceramic tile grouts (sand-portland cement, dry-set, commercial Portland cement, and latex-portland cement grouts) comply with ANSI A108.10.

3.4 FLOOR INSTALLATION METHODS

A. Porcelain Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:

1. Portland Cement Mortar: ANSI A108.1.

a. Bond Coat: Latex-portland cement mortar on cured bed, ANSI A108.5.

(1) Latex-portland cement mortar.

b. Concrete Subfloors, Interior: TCA F113 (bonded).

3.5 WALL TILE INSTALLATION METHODS

A. Install types of tile designated for wall application to comply with requirements indicated below for setting bed methods, TCA installation methods related to subsurface wall conditions, and grout types:

1. Latex-Portland Cement Mortar: ANSI A108.5.

a. Wood or Metal Studs, Interior: TCA W243.

b. Masonry, Interior: TCA W202.

c. Grout: Latex-portland cement.

3.6 CLEANING AND PROTECTION

A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer’s printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbounded, or otherwise defective tile work.

C. Provide final protection maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration at time of substantial completion.

1. When recommended by the tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.

2. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09 3000

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ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

C. RELATED SECTIONS: The following sections contain requirements that relate to this section:

1. Division 01 Section 01 9000: "Material Selection List"
2. Division 02 Section "Selective Structure Demolition" for demolition work.
3. Division 09 Section "Gypsum Drywall Assemblies" for gypsum board ceilings and soffits.
4. Division 23 Section "Air Distribution" for grilles, registers, and diffusers in acoustical ceilings.
5. Division 26 Section "Lighting Fixtures and Luminaires" for lighting fixtures in acoustical ceilings.

1.2 DESCRIPTION OF WORK

A. This Section includes the following related to acoustical panel ceilings and suspension systems:

1. Installation of new acoustical lay-in ceiling panels in new grid system, as indicated on the drawings.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Division 01 Section "Submittals."

B. Product Data for each type of product specified.

C. Samples for initial selection purposes in form of manufacturer's color charts consisting of actual acoustical units or sections of units showing full range of colors, textures, and patterns available for each type of unit.

D. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.4. QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has successfully completed acoustical ceilings similar in material, design, and extent to those indicated for Project.

B. Fire-Performance Characteristics: Provide acoustical ceilings that are identical to those tested for the following fire-performance characteristics, according to ASTM test method indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
   a. Flame Spread: 25 or less.
   b. Smoke Developed: 0.

C. Single-Source Responsibility for Ceiling Units: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

D. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

E. Coordination of Work: Coordinate layout and installation for acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures and HAVC.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Space Enclosure: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.7 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that products installed, are packaged with protective covering for storage, and are identified with appropriate labels.

1. New Acoustical Ceiling Units: Furnish quantity of full-size units equal to 2.0 percent of amount installed.
2. New Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING UNITS, GENERAL

A. Standard for Acoustical Ceiling Units: Provide manufacturer's standard units of configuration indicated that comply with ASTM E 1264 classifications as designated by references to types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated 24" x 24" as indicated on the drawings.

2.2 METAL SUSPENSION SYSTEMS, GENERAL

A. Standard for Metal Suspension Systems: Provide manufacturer's standard metal suspension systems of types, structural classification, and finish indicated that comply with applicable ASTM C 635 requirements.

B. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

D. Wire for Hangers and Ties: ASTM A 6641, Class 1 zinc coating, soft temper.

1. Gage: Provide wire sized so that stress at 3 times hanger design load ASTM C 635, Table 1, Direct-Hung), will be less than yield stress of wire, but provide not less than 0.106-inch diameter (12 gage).

E. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, provide manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated.
1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.3 ACCEPTABLE MANUFACTURERS – METAL SUSPENSION SYSTEMS
A. Armstrong
B. Chicago Metallic
C. USG Interior Systems
D. Substitutions: under provisions of Division 01 Section, "Product Requirements".

2.4 NON-FIRE-RATED DIRECT-HUNG SUSPENSION SYSTEMS
A. Non-Fire-Rated Double Web Steel Suspension System:
1. Structural Classification: Intermediate-Duty System.
2. Flange Width: Armstrong Prelude XL 15/16" verify with panel system noted below
3. Web Height: 1-1/2"
4. Cross Tees: Override
5. Finish: PRE-FINISHED Paint, to match ceiling tile

2.5 ACCEPTABLE MANUFACTURERS – ACOUSTIC UNITS
A. ACT-1 Basis of design: Armstrong,Cirrus Angled Tegular
1. Style: AngledTegular
2. Size: 2' x 2'
3. Color: White
1. Acoustic Panel Requirements: Non-Fire Resistance Rated Panels; ASTM E 1264, Type XX, Pattern G, smooth-textured vinyl covered gypsum panel
a. Size: 2' x 2' inches (nominal).
B. Substitutions: under provisions of Division 01 Section, "Product Requirements".

2.6 ACOUSTIC UNIT MATERIALS
A. ACT-1 – Acoustical Panels
1. Acoustic Panel Requirements: Non-Fire Resistance Rated Panels; ASTM E 1264, Type III, Form 1, Pattern EI, Mineral Fiber Base Panels, nodular, cast, or molded.
a. Size: 24 x 24 inches (nominal) where indicated.
b. Thickness: 7/8"
c. Composition: mineral fiber.
d. Light Reflectance: .86 for white
e. NRC: 0.70
f. CAC: 38
g. Flame spread rating: 0-25 (ASTM E 84), Class A.
h. Edge: Angled Tegular.
i. Surface color: White
j. Surface finish: factory applied latex paint
k. Surface texture: fine

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage of ceiling system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for preset inserts, clips, or other ceiling anchors whose installation is specified in other sections.

B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling, unless otherwise indicated. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

C. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, counter-splaying or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Where suspended acoustical ceiling is indicated to be installed beneath gypsum board ceiling systems secure suspension system to gypsum board suspension framing above.
4. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and in manner which will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices that are attached as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Space hangers not more than 4’-0” o.c. along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8-inches from ends of each member.

D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.

1. Screw-attach moldings to substrate at intervals not over 16-inches o.c. and not more than 3-inches from ends, leveling with ceiling suspension system to tolerance of 1/8-inch in 12’-0”. Miter corners accurately and connect securely.

E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

3.4 CLEAN

A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5113

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RESILIENT FLOORING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. Extent of resilient flooring and accessories is shown on drawings Material Selection List and in schedules; and includes:
   1. Luxury Vinyl Tile (LVT) Flooring.
   2. Resilient Base.
   3. Resilient Floor Transition.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.

B. Samples for Initial Selection Purposes: Submit manufacturer's standard color charts in form of actual sections of resilient flooring, including accessories, showing full range of colors and patterns available, for each type of resilient flooring required.

C. Samples for Verification Purposes: Submit the following samples of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.
   1. Full size resilient plank samples.
   2. 2-1/2" long samples of resilient flooring accessories.
   3. Other materials as required.

D. Certification for Fire Test Performance: Submit certification from independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with fire test performance requirements.

E. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

1.4. QUALITY ASSURANCE

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer's instructions, site conditions, or applicable codes and standards; request clarification from the Architect before proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

C. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.

D. Critical Radiant Flux (CRF): Not less than the following rating per ASTM E 648.
   1. 0.45 watts per sq. cm.

E. Flame Spread: Not more than 75 per ASTM E 84.

F. Smoke Developed: Not more than 450 per ASTM E 84.

G. Smoke Density: Not more than 450 per ASTM E 662.

H. Installer's Qualifications: Engage Installer who is certified in writing by resilient flooring manufacturer as qualified for installation of sheet vinyl employing heat welded seams.

1.5 PROJECT CONDITIONS

A. Maintain minimum temperature of 65°F (18°C) in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store resilient flooring materials in temperature of 55°F (13°C) in areas where work is completed.

B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Manufacturers of Resilient Wall Base:
   a. Johnsonite
   b. equal by Armstrong World Industries, Inc.
   c. equal by Roppe
   d. Tarkett
2. Manufacturers of Luxury Vinyl Tile: J+J Flooring

2.2 RESILIENT FLOORING COLORS AND PATTERNS

A. Provide color and patterns as indicated, or if not otherwise indicated, as selected by Architect from manufacturer's standards.

2.3 RESILIENT VINYL TILE FLOORING

A. LVT-1: Luxury Vinyl Tile J+J Flooring
Style: Classics (3mm) V5000
Color: 1007 Curio
Finish: UV Cured Urethane with ceramic bead/ micro beveled/ light embossed
Antimicrobial: ZPT (zinc protective technology)
Wear Layer: 20 mil
Format: 9" x 48" (nominal)
Pattern Repeat: Random wood pattern
Total Thickness: 3mm
Class/ ASTM F1700: Class III printed film vinyl plank – type B embossed
Square feet per plank/ tile: 3.00
Square feet per carton: 39.0
Installation: full spread
Required Adhesive: J+J adhesive: Commercialon^{R} Premium LVT
Warranty: 10 year commercial

2.4 ACCESSORIES

A. Resilient Wall Base: Provide vinyl base complying with FS SS-W-40, Type II, with matching end stops and preformed or molded corner units, and as follows:
   1. Basis of Design:
      a.Tarkett Johnsonite Baseworks Thermoset Rubber 4", Color-Espresso (to be verified with all color selections)
   2. Height: 4 inches.
   3. Thickness: 1/8 inch gage.
   4. Style: Standard base with cove.
   5. Finish: Matte.

B. Resilient Edge Strips: 1/8 inch thick, homogenous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1 inch wide.

C. Resilient Transition Strips: "Slim Line Transitions" SLT-XX-A by Tarkett/Formerly Johnsonite. Color: (TO BE SELECTED BY OWNER)

D. Adhesives (Cements): Waterproof, stabilized type as recommended by flooring manufacturer to suite material and substrate conditions.

E. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

F. Leveling Compound: Latex type as recommended by flooring manufacturer.

PART 3 – EXECUTION

3.1 INSPECTION

A. Require Installer to inspect subfloor surfaces to determine that they are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, and coatings preventing adhesive bond, and other defects impairing performance or appearance.

B. Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compounds.

C. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.

3.2 PREPARATION

A. Prepare subfloor surfaces as follows:
   1. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.
   2. Remove coatings from subfloor surfaces that would prevent adhesive bond, including curing compounds incompatible with resilient flooring adhesives, paint, oils, waxes and sealers.

B. Broom clean or vacuum surfaces to be covered, and inspect subfloor.

C. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

3.3 INSTALLATION, GENERAL

A. Where movable partitions are shown, install resilient flooring before partitions are erected.

B. Install resilient flooring using method indicated in strict compliance with manufacturer's printed instructions. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

C. Scribe, cut and fit resilient flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.

D. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent marking device.

E. Tightly cement resilient flooring to sub-base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.

F. Seal perimeter of sheet vinyl to wall with 1/4" coved bead of silicone caulk compatible with flooring.

G. Install transition strip where dissimilar floor finishes meet. Secure with adhesives.

3.4 INSTALLATION OF PLANK FLOORS

A. Lay plank from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid use of cut widths less than ½ tile at room perimeters. Lay planks square to room axis, unless otherwise shown.

B. Match planks for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.

1. Lay plank with grain running parallel to short dimension of room. Joints shall be continuous in both directions.

3.5 INSTALLATION OF ACCESSORIES

A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

1. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

B. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

3.6 CLEANING AND PROTECTION

A. Perform following operations immediately upon completion of resilient flooring:

1. Sweep or vacuum floor thoroughly.
2. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.
3. Damp-mop floor being careful to remove black marks and excessive soil.
4. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.

B. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions.
   1. Apply protective floor polish to resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available metal cross-linked acrylic product acceptable to resilient flooring manufacturer.
   2. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
   3. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.

C. Clean resilient flooring not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Clean resilient flooring by method recommended by resilient flooring manufacturer.

END OF SECTION 09 6500

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CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. Extent, location, and details of each type of carpeting are indicated on drawings, carpet data sheets, and in schedules.

B. Work of this section includes furnishing and installation of carpeting, adhesives and accessories.

1.3 DEFINITIONS

A. Commercial Carpet: Carpet intended for use in commercial and public spaces, with construction, fire ratings, static control and appearance appropriate for this use.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of carpeting material and installation accessory required; include methods of installation for each type of substrate.
   1. Submit written data on physical characteristics, durability, resistance to fading and flame resistance characteristics.

B. Samples for Initial Selection Purposes: Submit manufacturer's standard size samples and color yarns showing full range of colors, textures and patterns available for each type of carpet required.

C. Samples for Verification Purposes: Submit the following:
   1. 18 inch square samples of each type of carpet material required.
   2. 12 inch long samples of each type of exposed edge stripping and accessory item.

D. Prepare samples from same material to be used for the Work.

E. Maintenance data for carpet to be included in the Operation and Maintenance Manual Specified in Division 01. Include the following
   1. Methods for maintaining carpet, including manufacturer's recommended frequency for maintaining carpet.
   2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance. Include cleaning and stain removal products and procedures.

1.5. QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm (material producer) with not less than 3 years of production experience, whose published product literature clearly indicates general compliance of products with requirements of this section.

B. Installer Qualifications: Firm specializing in carpet installation with not less than 2 years of experience in installation of carpeting similar to that required for this project.

C. Single Source Responsibility: Provide material produced by a single manufacturer for each carpet type.

1.6 TESTING

A. Test Reports: Submit certified test reports evidencing compliance with requirements for the following
   1. Fire performance characteristics.
   2. Physical properties indicated.

B. Fire Performance Characteristics: Provide carpeting that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Flammability: As follows:
      a. Rating: Passing Methenamine Pill Test.
      b. Test Method: ASTM D 2859.
   2. Surface Burning Characteristics: As follows:
      a. Flame Spread: Not more than 75.
      b. Smoke Developed: Not more than 100.
      c. Test Method: ASTM E 648.
   3. Critical Radiant Flux: As follows:
      a. Rating: Not less than 0.45 watts per sq. centimeter.
      b. Test Method: ASTM E 648.
   4. Smoke Density: As follows:
      a. Rating:
         (1) With flame, 15.4 minimum value.
         (2) Without flame, 9.1 minimum value.
      b. Test Method: ASTM E 662.

C. Physical Properties: Provide carpeting that is identical to that tested for the following physical properties, according to the test method indicated.
   1. Sound Absorption Characteristics: As follows:
      a. Rating: Passing sound absorption coefficient level.
      b. Test Method: ASTM C 423.
   2. Fade Resistance: As follows:
      a. Rating: Maximum grey scale factor of 40 hours.
      b. Test Method: AATCC 16E.
   3. Static Resistance:
      a. Rating: 1.8 KV when tested at 20% R.H./70 deg. F.
      b. Test Method: AATCC 134.

D. Microbial Resistance:
   1. Rating: Minimum 90% bacterial reduction.
   2. Test Method: AATCC 100.
   3. Rating: Maximum 20% fungal growth.
   4. Test Method: AATCC 30.
   5. Rating: Exhibits no zone of inhibition.
   6. Test Method: AATCC 90.

E. Certification: Submit manufacturer's certificate stating that materials_furnished comply with specified requirements. Include supporting certified laboratory testing data indicating that material meets specified test requirements.

F. **Environmental Requirements: Carpeting must be certified to meet Carpet and Rug Institute's Green Label and/or Green Label Plus certification program**

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity; laid flat, blocked off ground to prevent sagging and warping. Maintain temperature in storage above 40 degrees Fahrenheit.

B. Comply with instructions and recommendations of manufacturer for special deliver, storage, and handling requirements.

1.8 SEQUENCING AND SCHEDULING

A. Sequence carpet installation with other work to minimize possibility of damage and soiling during remainder of construction period.

1.9 WARRANTY

A. Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and the Manufacturer, agreeing to repair or replace carpeting which fails in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs and delamination.

1. Warranty period is 10 years after the date of substantial completion.

1.10 MAINTENANCE

A. Maintenance Instructions: Submit Manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against materials and methods which may be detrimental to finishes and performance.

B. Replacement Materials: After completion of work, deliver not less than 2% of each type, color, and pattern of carpeting, exclusive of material required to properly complete installation. Furnish accessory components as required. Furnish replacement materials from same production run as materials installed. Package replacement materials with protective covering, identified with appropriate labels.

PART 2 - PRODUCTS

2.1 CARPET-1: AUDITORIUM Aisles & Landings

A. CPT-1: Millliken's Max System Broadloom carpet

SPECIFICATIONS:

Style Name & Number:

Option 1: Design Corinthius: E05TU85DSE/ E05TU85DSE-E24004
Base: Royal 36 – 13.5'

Option 2: Design: Ancient Garden: E06M987DSE/ E06M987DSE-24004
Base: Max 36 – 13.5'

Color: to be selected at a later date from options & physical samples

Construction: Tufted, Patterned Cut Pile

Dye Method: Digital Millitron^{R} Dye Injection

Colorways Available: Max or Mod Colors

Face Fiber: Milliken WearOn^{R} BCF Nylon Type 6,6

Stain and Soil Protectant: MilliGuard[R]
Mold/ Mildew Odor Control: AlphaSan[R] Built-In Protection
Tufted Face Weight: 36 oz./sq.yd. (1,220.7 g./sq.m.)
Tufting Gauge: 1/10 (39.4/10/cm)
Stitches: 11.3/in (44.5/10 cm)
Tufting Density: 113.0/sq.in. (1,753.3/100 sq.cm.)
Finished Pile Height: 0.25 in. sheared (6.4 mm.)
Average Density: 5,184
Primary Backing: Synthetic Woven
Secondary Backing: Endura-Loc[TM]
Recycled Content with Endura-Loc: 1% Pre-Consumer
Recycled Content with optional attached pad: 1% Pre-Consumer, 12% Post-Consumer, 3% Rapidly Renewable
Nominal Total Thickness: 0.31 Sheared (7.9 mm)
Width: 13'-6" (4.11 m.)
Nominal Total Weight: 69.8 oz./sq.yd. (2,366.7 g./sq.m.)
Flammability (Radiant Panel ASTM-E-648): ≥ 0.45 (Class I)
Smoke Density (NFPA-258-T or ASTM-E-662): ≤ 450 Flaming and Non-Flaming
Static Electricity (AATCC-134) 20% R.H., 70° F.: ≤ 3.5 KV
Texture Appearance Retention Rating (TARR): Severe Traffic End-Use Applications
Recommended Maintenance: MilliCare[R] Textile & Carpet Care Service Network
Indoor Air Quality – CRI Green Label Plus[TM]: GLP2860, Carpet Category 1Y

CARPET-2: COMMUNITY ROOM

B. CPT-2: J+J Industries

SPECIFICATIONS:

Style Name & Number: Elemental (style 7683) modular
Color: 2632 Heritage
Backing: Nexus[R] Modular
Size: 24" X 24" carpet tile (61.0 cm x 61.0 cm)
Fiber Type: Encore[R] Ultima[R] Nylon with recycled content
Construction: Tip Sheared Pattern Loop
Dye Method: Solution Dyed
Ounce Weight: 18.0 oz./ sq. yd. (610 grams/sq.m.)
Gauge: 1/12" (4.72 rows /cm.)
Thickness: .25" (0.635cm.) (nominal average)
Pattern Repeat: n/a
Installation Method: To Be Determined
Adhesive: Per manufacturer's recommendations.

2.2 ACCESSORIES

A. Concrete Slab Primer: Non-staining type as recommended by the carpet manufacturer.

B. Trowelable Underlayments and Patching Compounds: As recommended by the carpet manufacturer.

C. Carpet Edge Guard, Nonmetallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated; minimum 2 inch wide anchorage flange; colors selected by Architect from full range of manufacturer's colors. At CPT to LVP transitions.

D. Installation Adhesive: Water-resistant, mildew resistant, non-staining type as recommended by carpet cushion manufacturer, and which complies with flammability requirements for installed carpet.

E. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and preventing pile loss at seams.

F. Miscellaneous Materials: As recommended by manufacturers of carpet and other carpeting products; selected by Installer to meet project circumstance and requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for moisture content and other conditions under which carpeting is to be installed. Notify Contractor in writing of major conditions detrimental to proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

B. Verify that subfloors and conditions are satisfactory for carpet installation and comply with requirements specified in this Section and those of the carpet manufacturer.

3.2 PREPARATION

A. General: Comply with carpet manufacturer's installation recommendations to prepare substrates indicated to receive carpet installation.

B. Repair minor holes, cracks, depressions, rough areas using material recommended by carpet or adhesive manufacturer.

C. Level Subfloor to within ¼ inch in 10 feet, non-cumulative, in all directions. Sand or grind protrusions, bumps, and ridges. Patch and repair cracks and rough areas. Fill depressions.

1. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by the carpet manufacturer.

D. Remove subfloor coatings, including substances that are incompatible with adhesives and that contain soap, wax, oil or silicone.

E. Clear away debris and scrape up cementitious deposits from surfaces to receive carpeting; vacuum clean immediately before installation. Following cleaning, examine subfloors for moisture, alkaline salts, carbonation, or dust. Check concrete surfaces to ensure no dusting through installed carpet; apply sealer where required to prevent dusting.

F. Concrete subfloor preparation: Apply concrete-slab primer, according to manufacturer's directions, where recommended by the carpet manufacturer.

3.3 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doors, center seams under doors; do not place seams in traffic direction at doorways.

B. Extend carpet under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.

C. Provide cut-outs where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.

D. Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.

E. Expansion Joints: Do not bridge building expansion joints with continuous carpeting, provide for movement.

F. Peel & Stick Modular Tile Installation:

1. Follow manufacturer's recommendations.

G. Adhesive Roll Installation:

2. Stair tread & riser: glue per manufacturer's recommendations (no stair nosing)

3.4 CLEANING

A. Remove and dispose of debris and unusable scraps. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed. Remove any protruding face yare using sharp scissors.

3.5 PROTECTION

A. Provide protective methods and materials needed to ensure that carpeting will be without deterioration or damage at time of substantial completion.

END OF SECTION 09 6813

SPECIAL WALL SURFACING (GLASS FIBER REINFORCED PLASTIC PANELING)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Fiberglass reinforced plastic (FRP) paneling for wall and ceiling surfaces, including trim accessories.

B. Related Sections: Section(s) related to this section include:

1. 09 2900 – Gypsum Drywall
2. 07 9200 - Sealants

1.2 REFERENCES

A. General: Standards listed by reference form a part of this specification section. Standards listed are identified by issuing authority, abbreviation, designation number, title or other designation. Standards subsequently referenced in this Section are referred to by issuing authority abbreviation and standard designation.

B. ASTM International:

1. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
2. ASTM D5319 – Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
3. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Crane Composites (Inspired by Kemlite):

1. Installation Guide For FRP Panels #6876.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Conduct preinstallation meeting to clarify Project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 ACTION SUBMITTALS

A. Product Technical Data: For each type of product required.

B. Shop Drawings: Showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location and dimension of joints and fastener attachment.

C. Samples: Selection and verification samples for finishes, colors and textures. Submit two samples of each type of panel, trim and fastener.

D. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.

E. Test and Evaluation Reports: Showing compliance with specified performance characteristics and physical properties.

G. Manufacturer's Instructions: Manufacturer's Installation Guide for FRP #6876.

H. Qualifications Statements: For manufacturer and installer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.

B. Warranty: Warranty documents required in this section.

1.6 MAINTENANCE MATERIAL

A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 01 Closeout Submittals Section.

1. Quantity: Furnish quantity of units equal to 5% percent of amount installed.
2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Provider of advanced installer training.

B. Installer Qualifications:

1. At least five years experience in the installation of fiberglass reinforced plastic panels.
2. Experience on at least five projects of similar size, type and complexity as this Project.
3. Employer of workers for this Project who are competent in techniques required by manufacturer for installation indicated.

C. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner and Architect approval and acceptance of finish color, texture, pattern, trim, fasteners and quality of installation.

1. Mock-Up Size: Minimum 2 panels in place to show typical installation.
2. Maintenance: Maintain mock-up during construction for quality comparison. Remove and legally dispose of mock-up when no longer required.
3. Incorporation: Mock-up may be incorporated into final construction upon Owner approval.

D. Surface-Burning Characteristics: Determined by testing identical products according to ASTM E84 by a testing agency acceptable to authorities having jurisdiction.

1. Flame-Spread Index: **200 (Class C)** or less.
2. Smoke-Developed Index: **450** > or less.

E. Meets USDA/FSIS requirements.

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.

B. Storage and Handling: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels in a dry indoor location at Project site. Remove any foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.9 PROJECT CONDITIONS

A. Ambient Conditions:

1. Do not begin installation until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.
2. During installation, and within 48 hours prior to installation, maintain ambient temperature and relative humidity within limits required by type of panel adhesive used and recommendation of panel adhesive manufacturer.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace FRP panels that fail within specified warranty period.
   1. Failures shall include, but not be limited to substantial defects in material and workmanship, rotting, rusting, corrosion, development of structural surface cracks, or requiring painting or refinishing.
   2. Warranty Period: Ten years from date of Substantial Completion.

B. Special Warranty: Installer's standard form in which installer agrees to repair or replace FRP panels that fail due to poor workmanship or faulty installation within the specified warranty period.
   1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FIBERGLASS REINFORCED PLASTIC (FRP) PANELS

A. General: Fiberglass reinforced plastic panels complying with ASTM D5319.

B. Basis of Design Product: Subject to compliance with requirements provide Crane Composites, Inc.; Glasbord Fiberglass Reinforced Plastic (FRP) Panels, **Glasbord-P (PIF)**

C. Substitution Limitations:**All other manufacturers: Submit substitution request in accordance with Section 012500 - "Substitution Procedures"**
   1. EQUAL BY KAL-LITE

D. Product Options:
   1. Color: **As selected by Architect from manufacturer's full range**
   2. Surface Finish: **Pebbled embossed texture**.
   3. Nominal Thickness: **0.09 inch (2.3 mm)**
   4. Wall Panel Size: **As indicated on drawings**, **4 feet (1.2 m) by 10 feet (3 m)**
   5. Surface Protection: Manufacturer’s proprietary molecularly-bonded surface protection film for fiberglass reinforced plastic (FRP) panels.

E. Performance Criteria:
   1. Scratch Resistance: ASTM D2583, Barcol Hardness of **35**
   2. Abrasion Resistance: Taber Abrasion Test using CS-17 abrasive wheels with 1000 g weight. Panels shall exhibit weight loss after 25 cycles of no more than 0.038 percent.
   3. Impact Strength: ASTM D5420, **6.0 in-lb (0.32 J)** showing no visible damage on finish side.
   4. Product Identification: Finish side identification and confirmation of meeting **Class C** interior finish requirements after installation and while in service, without labels.

2.2 ACCESSORIES

A. Moldings, Trim and Caps: One-piece extruded polypropylene or PVC, configured to cover panel edges and corners.
   1. Color: **As selected by Architect from manufacturer's full product range**.

B. Panel Adhesive: As recommended by panel manufacturer for the required substrates.
   1. Adhesive shall have a VOC content of **50** g/L or less.

C. Panel Seam Sealant: Bright white, two-part urethane sealant as recommended by FRP panel manufacturer.
   1. Basis-of-Design Product: Cleanroom Recommended Urethane Sealant (A-Resin, C-Curative, two-part urethane sealant).
   2. Sealant shall have a VOC content of 0.0 g/L.

D. Wall Protection Accessories: One-piece rubber accessories, configured to cover panel edges and corners.
   1. Color**: As selected by Architect from manufacturer's full product range**
   2. Profile**: Base Cove, Corner Guard, As selected by Architect from manufacturer's full product range**

2.3 SOURCE QUALITY CONTROL

A. Obtain fiberglass reinforced panels, moldings and other accessories from a single manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General: Comply with manufacturer’s product data, including product technical bulletins, and installation instructions in product catalogs and product packaging.

B. Verify that substrates previously installed under other sections are acceptable for product installation in accordance with FRP manufacturer’s instructions.
   1. Examine substrate surfaces to determine that corners are plumb and straight, that surfaces are smooth, sound and uniform, that nails or screw fasteners are countersunk, and that joints and cracks are filled flush and smooth with adjoining surfaces.
   2. Do not begin panel installation until substrate surfaces are in satisfactory condition.

3.2 PREPARATION

A. Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust or other contamination.

B. Condition panels by unpacking and placing in installation space no less than 24 hours before installation.

C. Lay out paneling before beginning installation. Locate panel joints to provide equal panel widths at ends of walls and so that trimmed panels at corners are not less than 12 inches (300 mm) wide.

3.3 INSTALLATION

A. General: Comply with panel manufacturer’s Installation Guide #6876.

B. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.

C. Install panels with manufacturer’s recommended gap for panel field and corner joints.
   1. Pre-drill fastener holes in panels, 1/8 inch (3.2 mm) greater in diameter than fastener.

2. Install panels in a full spread of adhesive. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

D. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.

E. Sealant:

1. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
2. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths.

3.5 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

B. Repair or replace any installed products that have been damaged.

C. Clean installed panels in accordance with manufacturer's instructions prior to Owner's acceptance.

D. Remove and lawfully dispose of construction debris from project site.

3.6 PROTECTION

A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION 09 7700

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PAINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

B. Related Sections: The following contain requirements that relate to this section:

1. Division 07 Section “Joint Sealants” for sealing intersections of differing materials.
2. Division 09 Section “Gypsum Board Assemblies” & “Plaster Restoration”

1.2 SUMMARY

A. Extent of painting, stain and finish work is indicated on drawings and schedules, and as herein specified.

B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout Project, except as otherwise indicated including but not limited to:

1. Paint and Stain
   a. Ferrous Metals – Hollow metal doors and frames, Stair Exit Gates, Existing Gallery Gates, Existing Elevator Doors & Frames, Existing Light Rigging Poles, Sheet metal and miscellaneous items indicated to be painted.
   b. Gypsum Drywall or Existing Plaster
2. Stain and clear coat.
   a. New wood trim
   b. Restored wood handrails and wall caps
   c. as indicated on documents
3. Note: Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
4. Note: Surface preparation, includes the preparation of existing surfaces that may contain lead based paint. If encountered, proceed in compliance with all applicable codes and regulations.
5. Work of this section also includes the preparation of joints and installation of sealants in preparation for painting of all exterior siding, trim and ornamental items. Sealant materials and installation shall be compliance with requirements of Division 07 Section – Joint Sealants.
6. Wood Restoration: existing handrails and wood wall caps

C. Paint as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

D. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in “schedules”. Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.

E. Following categories of are not included as part of field-applied finish work.

1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) pre-finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.

F. Following categories are included under other sections of specifications.
1. Shop Primers: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.
2. Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework and shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.

G. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

C. **CONTRACTOR REQUIRED TO VERIFY EXISTING PAINT TYPE (Oil or Latex) TO DETERMINE OIL OR LATEX PRIMER (complete paint analysis by paint testing company if paint type cannot be determined)**

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including Paint label analysis and application instructions for each material proposed for use.

B. **Mock-ups Auditorium:**

1. Provide three (3) approximately 12'-0" x 12'-0" paint sample mock-ups in the Auditorium as shown on interior elevations.
-Owner to determine Auditorium paint scheme from these mock-ups.

C. **Mock-ups Existing Corridor 116:**

Provide two (2) approximately 2'-0" x 2'-0" paint sample mock-ups at center of corridor adjacent middle double doors (north & south sides) with 3 colors for a total of 4 mock-ups.

1. Option 1: Paint colors to include: PT-2 & PT-3 & PT-4 (at door jamb-north)
2. Option 2: Paint colors to include: PT-3 & PT-4 & PT-5 (at door jamb-north)

-Owner to determine Existing Corridor 116 paint scheme from these mock-ups.

D. **Mock-ups Existing Corridor 135:**

Provide one (1) approximately 2'-0" x 2'-0" paint sample mock-ups at center of corridor (east & west sides) with 3 colors in Existing Corridor 135 for a total of 2 mock-ups.

1. Option 1: Paint colors to include: PT-2 & PT-1 (Sherwin Williams Pure White and Benjamin Moore White Dove OC-17—for comparison)

E. **Paint Samples—all other paints:** Provide a listing of material and application for each coat of each finish sample for colors PT-6, PT-7 and PT-8 (2 options as noted below for Metallic Gold Leaf as noted below)

1. Contractor will provide three samples of each color and material, on a 8-1/2" x 11" hardboard, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.

F. **Stain Mock-ups:**

1. Provide stain mock-up samples in place for one (1) location each of restored wood handrails and wood wall caps to match existing color & finish.
2. Provide stain samples for all new wood to match existing color

1.5 DELIVERY AND STORAGE

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's name, stock number and date of manufacture.
4. Contents by volume, for major pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

1. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.6 JOB CONDITIONS

A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50° (10°C) and 90°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
   1. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer: The painting systems schedule included in these specifications uses the products of Sherwin-Williams or Benjamin Moore and Co. to establish systems and a level of quality. The following additional paint manufacturer's offering similar systems and products may be used subject to compliance with requirements:
   1. General Coatings:
      a. The Sherwin-Williams Company (SW).
      b. Benjamin Moore
      c. PPG or Krylon (Metallic Gold)
   2. Stain:
      a. Sherwin-Williams Minwax

2.2 MATERIALS

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by the specified paint materials manufacturer. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
   1. All exterior coatings shall be blister, alkali, fade and mildew resistant.

B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.
   1. Lead content in pigment, **NOT ALLOWED**

C. Exterior Cleaning Solution Materials:
   1. Water.
   2. Household bleach.
   3. "Jomax"; Zehrung, Chemrad Division.

D. Sealant Materials: as specified in Section 07 9200 Joint Sealants.

PART 3 – EXECUTION

3.1 INSPECTION

A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been correct in a manner acceptable to Applicator.

B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

C. Do not paint over dirt, mildew, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

A. Preparation of Existing Surfaces Containing Lead Based Paint: Preparation of existing surfaces containing lead based paint shall be in compliance with all applicable codes and regulations for the preparation, handling and disposal of lead containing materials.

B. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
   1. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
   2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
   3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

C. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
   1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct his condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

D. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
   1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.
   2. When transparent finish is required, use spar varnish for backpriming.
   3. Backprime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.
   4. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

E. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
   1. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.

F. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 WOOD RESTORATION

A. Prepare existing surfaces using Denatured Alcohol & Cleaning Cloth

1. Handrails Denatured Alcohol, sealer and varnish

a. Add solution to clean, soft cloth and wipe

b. Monitor cloth to ensure you do not rub through the wood to the finish below

c. At stubborn areas, apply with super fine 4 oz. steel wool & rub with the grain of the wood (do not rub through the wood to the finish below)

d. Very lightly sand with 220 grit sand paper (not too much pressure)

e. Ensure the wood is ready to absorb varnish

f. Clean dust off with light coat denatured alcohol

g. Apply one final coat of denatured alcohol and let dry

h. Apply minimum 2 coats of sealer and sand in between

i. Apply minimum 2 coats of varnish

B. General: Perform preparation and cleaning procedures in accordance with finish manufacturer's instructions and as herein specified, for each particular substrate condition.

3.4 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.5 APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract document.
2. Provide finish coats which are compatible with prime paints used.
3. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.
5. Sand lightly between each succeeding enamel or varnish coat.
6. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

B. Schedule Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel stick

under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

D. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed to exterior or in occupied spaces.

E. Prime Coats: Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.

1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

F. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

G. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

H. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.6 CLEAN-UP AND PROTECTION

A. Clean-up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

1. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scarping, using care not to scratch or otherwise damage finish.

B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
2. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.7 INTERIOR PAINT SCHEDULE

A. **Environmental Requirements: Provide the following paint systems subject to compliance with requirements, including low odor and zero VOC emitting products that contain no formaldehyde, crystalline, silica, or ethylene glycol.**

B. General: Provide the following paint systems for the various substrates, as indicated.

PT-1: SW 7005 Pure White OR Benjamin Moore White Dove OC-17

PT-2 SW 7036 Accessible Beige

PT-3 SW 7037 Balanced Beige

PT-4 SW 7040 Smokehouse

PT-5 SW 9183 Dark Clove

PT-6 SW 9179 Anchors Away

PT-7 SW 6990 Caviar

PT-8 Krylon Brilliant Metallic Gold Leaf OR PPG Metallic Tones Gilded Gold

C. Gypsum Drywall OR Plaster Wall Material:

1. Low-Luster, Acrylic-Enamel Finish: Two coats over a primer.

CONTRACTOR REQUIRED TO VERIFY EXISTING PAINT TYPE TO DETERMINE OIL OR LATEX PRIMER

a. Primer: Latex based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils. Low VOC

(1) Sherwin Williams: Interior Latex Primer, w/deep base for darker colors.

b. First and Second Coats: SHERWIN WILLIAMS PROMAR 400 (eg-shell) latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.

E. Stained Woodwork: All new stained items to be pre-finished prior to installation. Existing Restored woodwork to be finished in place.

1. Polyurethane, Matte Varnish Finish: Two finish coats over stain plus filler on open-grain wood. Wipe filler before applying first varnish coat.

a. Filler Coat: Paste wood filler.

b. Stain Coat: Oil-type exterior wood stain.

c. Sealer Coat: Clear sanding sealer applied at a spreading rate recommended by the manufacturer.

d. Second and Third Coats: Varnish finish applied at a spreading rate recommended by the manufacturer.

(1) Color to be selected by Architect from manufacturer's full range to match existing.

3.8 EXTERIOR PAINT SCHEDULE

A. Environmental Requirements: Provide the following paint systems subject to compliance with requirements, including low-VOC emitting products that contain no formaldehyde, crystalline silica, or ethylene glycol.

B. General: Provide the following paint systems for the various substrates, as indicated.

C. Ferrous Metal: ALL HANDRAILS

1. Semi-gloss Acrylic Enamel Finish: Two finish coats over primer.

a. Primer: Rust-inhibiting metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.

(1) Sherwin Williams: Rust Inhibitive Primer.

b. First and Second Coats: Semi-gloss, exterior, Acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.

(1) Sherwin Williams: All Surface Enamel Latex Base,

D. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces:
   1. Semi-gloss Acrylic Enamel Finish: Two finish coats over a galvanized metal primer.
      a. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
         (1) Sherwin Williams: Primer.
      b. First and Second Coats: Semi-gloss, exterior, Acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
         (1) Sherwin Williams: All Surface Enamel Latex Base,
         (1) Color to be selected by Architect from manufacturer's full range.

END OF SECTION 09 9100

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SIGNAGE

PART 1 – GENERAL

1.1 SECTION INCLUDES
- A. Room signs.

1.2 RELATED SECTIONS
- A. Section 04 21 13 - Brick Assemblies .
- B. Section 09 22 16 - Gypsum Board Assemblies.

1.3 REFERENCES
- A. American National Standards Institute (ANSI): ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

1.4 SUBMITTALS
- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  1. Installation methods.
  2. Maintenance methods.
  3. Cleaning methods.
  4. Preparation instructions and recommendations.
  5. Storage and handling requirements and recommendations.
- C. Shop Drawings: Submit shop drawings for each sign type to be used, including:
  1. Show layout, profiles, and product components, including edge conditions, accessories, finish colors, and textures.
  2. Show sign mounting types, heights, anchorage methods, and attachment devices.
- D. Selection Samples: For each finish product specified, two full-size signs representing manufacturer's full range of available colors and patterns.
- E. Sign Schedule: Use same designations indicated on Drawings.

1.5 QUALITY ASSURANCE
- A. Regulatory Requirements: Interior Signage shall comply with applicable requirements of ADAAG and ANSI A117.1
- B. Cast Metal Letter Manufacturer Qualifications: Manufacturer to have a minimum of 20 year experience in manufacturing letters.
- C. Installer Qualifications: Minimum 2 year experience installing similar products.
- D. Sourcing: All cast metal signage shall be manufactured by one manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING
- A. Store products in accordance with manufacturer's requirements.
- B. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- D. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS
- A. Environmental Requirements: Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 SEQUENCING
- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY
- A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
- A. Interior Signage:
  1. Acceptable Manufacturer: Seton Identification Products, 20 Thompson Rd.; Branford, CT 06405-2842; ASD. Toll Free Tel: 800-243-6624; Tel: 203-488-8059; Fax: 800-345-7819; Email:aecinfo@seton.com; Web:www.seton.com/aec.
  2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 INTERIOR SIGNAGE
- A. Architectural Signage System: As manufactured by Seton Identification Products.
  1. Color: As selected by Architect from manufacturer's full range of colors.
  2. See typical signage drawings detail 2/A7.0 for various signs required.
- B. Accessories: Installation accessories specified in manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION
- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION
- A. Install in accordance with manufacturer's instructions and in proper relationship to adjacent construction.
- B. Locate signs in accordance with ANSI A117.1 requirements.
- C. Install interior signs plumb and square.

3.4 PROTECTION
- A. Protect installed products until completion of project.
- B. Repair or replace damaged products before Substantial Completion.

3.5 SCHEDULES
- A. Signage Schedule as follows:
- B. See plan detail 2/A7.0 for sign requirements/schedule.

END OF SECTION 10 1400

TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Phenolic toilet compartments.

B. Phenolic urinal screens.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Blocking and supports.

B. Section 102800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2023a.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

D. ASTM A743/A743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application; 2021.

E. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, accessories, finishes.

C. Shop Drawings:
   1. Indicate plans, elevations, dimensions. Include door swings, toilet fixture centerlines, floor drains, on plans.
   2. Indicate details of wall, floor supports and attachments.
   3. Indicate cutouts for through-partition toilet accessories.

D. Samples:
   1. For Initial Selection: Submit color charts & samples for each type of toilet compartment material.

2. For Verification: Submit two samples of partition materials, 3 by 3 inches (76 by 76 mm) in size, indicating color.

E. Manufacturer's qualification statement.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle materials and products in accordance with manufacturer's instructions, recommendations, and industry standards.

B. Do not deliver materials or begin installation until building enclosed, with complete protection from outside weather, and maintain building temperature at minimum of 60 degrees F (15.6 degrees C).

C. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.

D. Lay cartons flat, with adequate support to ensure flatness and prevent damage to prefinished surfaces.

E. Do not store where ambient temperature exceeds 120 degrees F (49 degrees C).

1.08 FIELD CONDITIONS

A. Ambient Conditions: Maintain environmental conditions such as temperature, humidity, and ventilation within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Ambient Conditions: Maintain building temperature at minimum of 60 degrees F (15.6 degrees C) for 24 hours before, during, and after installation of toilet partitions.

C. Existing Conditions: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Black Core or Color-Thru Phenolic Finish Warranty: Provide 25-year manufacturer warranty against delamination, breakage or corrosion of black core or color-thru phenolic material properly maintained in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design Manufacturer: ASI Global Partitions: www.asi-globalpartitions.com/#sle.

B. Substitutions: See Section 016000 - Product Requirements.

1. Submit proposed substitutions in writing for approval by Architect minimum of 10 working days prior to bid date and make available to bidders. Accompany proposed substitutes with review of specification and ASI Group partition company specifications noting compliance on line-by-line basis.
2. Products other than Basis of Design are subject to compliance with specified requirements and prior approval of Architect. By using products other than Basis

of Design, Contractor accepts responsibility for costs associated with necessary modifications to related work, including design fees.

C. Source Limitations: Furnish products produced by single manufacturer, obtained from single supplier.

2.02 PHENOLIC TOILET COMPARTMENTS

A. Toilet Compartments: Color-Thru phenolic.
   1. Standard-58; floor-anchored, overhead-braced mounting.

B. Urinal Screens: Color-Thru phenolic, wall hung.

C. Design Criteria:
   1. Accessibility: Design compartments indicated on drawings to comply with ICC A117.1 and ADA Standards.
   2. Color-Thru Phenolic Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, Class A, when tested in accordance with ASTM E84.

D. Fabrication:
   1. Fabricate toilet compartment components to sizes indicated.
   2. Coordinate requirements and provide cutouts for through-partition toilet accessories and solid blocking within panel where required for attachment of toilet accessories.
   3. Provide shoes and caps at pilasters and posts to conceal anchorage, supports, and leveling mechanisms.
      a. Provide Easy-Stall shoes at floor-anchored, overhead-braced toilet compartments.
   4. Provide manufacturer's standard corrosion-resistant supports, leveling mechanisms, anchors, and anchoring assemblies for pilasters and posts.
   5. Floor-Anchored, Overhead-Braced Units: Provide supports, leveling mechanisms, Easy-Stall shoes, and anchors at pilasters to suit floor conditions.
   6. Floor Anchored, Overhead Braced Units with Adjustable Pedestals: Provide adjustable pedestals at pilasters to suit floor conditions.

2.03 COMPONENTS

A. Doors, Panels, and Pilasters: Phenolic-resin impregnated, wood-based product core with melamine-impregnated decorative surface papers and transparent, protective topcoat; NEMA LD 3 Compact Laminate.
   1. Finish: Matte.
   2. Color-Thru Phenolic Color: As selected from manufacturer's color card.
   3. Privacy: Provide interlocking doors and pilasters with integral Zero-Sightline System routed edges.

B. Standard Door and Panel Dimensions:
   1. Door Thickness: 3/4 inch (19 mm).
   2. Door Width: As indicated on drawings.
   3. Door Width for Handicapped Use: As indicated on drawings.
   4. Standard-58:
      a. Door Panel Height: 58 inches (1473 mm).
      b. Door Height above Floor: 12 inches (305 mm).
   5. Panel Thickness: 1/2 inch (13 mm).
   6. Urinal and Entrance Screen Panel Height: As indicated on drawings.
   7. Urinal and Entrance Screen Panel Height above Floor: As indicated on drawings.

C. Standard Pilasters: 3/4 inch (19 mm) thick, of sizes required to suit compartment width and spacing.
   1. Pilaster Height: 82 inches (2032 mm).
   2. Easy-Stall Pilaster Shoes: Formed 20 gauge, 0.0359 inch (0.91 mm) ASTM A666 Type 304 stainless steel with No.4 finish, 3 inches (76 mm) high, concealing floor fastenings and leveling bolts; secured to pilaster with stainless steel tamper-resistant screws; secured to floor with concrete anchors.
      a. Provide height and leveling adjustment with machine thread leveling bolts and bottom of pilaster threaded inserts.
      b. Provide Easy-Stall shoes at floor anchored, overhead braced toilet compartments.

D. Standard Head Rails: Hollow anodized aluminum tube, 1-inch by 1-5/8-inch (25 mm by 41 mm) size, with anti-grip surface and aluminum wall brackets.

2.04 MATERIALS

A. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.

C. Stainless Steel Castings: ASTM A743/A743M.

D. Zamac: ASTM B86, commercial zinc-alloy die castings, chrome plated.

E. Phenolic Panels: Monolithic core of phenolic resin, reinforced with cellulose fibers, manufactured under high pressure and at high temperatures, with melamine-impregnated decorative surface papers; NEMA LD 3, Compact Laminate.

2.05 HARDWARE AND ACCESSORIES

A. Brackets:
   1. Stirrup Type: Brushed stainless steel.

B. Standard Door Hardware: Brushed chrome-plated zamac:
   1. Hinges: Brushed stainless steel vault hinges, gravity type, adjustable for door close positioning; two per door.
   2. Latch and Keeper: Brushed chrome-plated zamac surface mount slide latch.
   3. Coat Hook: Manufacturer's standard coat hook with rubber bumper; one per compartment, mounted on door panel.
   4. Door Pull: Provide door pull for outswinging doors. Provide on both sides of doors designated as accessible.
   5. Door Bumper: Provide rubber-tipped door bumpers at out-swinging doors.

C. Attachments, Screws, and Bolts: Stainless steel, tamper-resistant type.
   1. For Attaching Panels and Pilasters to Brackets: Sex-type through-bolts and nuts, tamper-resistant.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that field measurements are as indicated.

C. Verify correct spacing of and between plumbing fixtures.

D. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's written instructions.

B. Attach Easy Stall shoe system to floor with 1/4 by 2 inch (6 by 52 mm) screws. Insert pilaster into Easy Stall shoe and secure after height adjustment.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster centerlines.

E. Field touch-up of scratches or damaged finish not permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch (6 mm).

B. Maximum Variation from Plumb: 1/8 inch (3 mm).

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hinges to locate doors in partially opened position when unlatched. Return outswinging doors to closed condition.

C. Adjust adjacent components for consistency of line or plane.

3.05 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

END OF SECTION 10 2113

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TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following new toilet accessory items:

1. Grab bars.
2. Utility Shelf/Mop Hooks
4. Mirror.
7. Sanitary Napkin Disposal Unit.
8. Baby Changing Stations.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product Data for each toilet accessory item specified, including details of construction relative to materials, dimension, gages, profiles, methods of mounting, specified options, and finishes.

C. Schedules: Indicating types, quantities, sizes, and installation locations (by room) for each toilet accessory item to be provided for project.

D. Setting Drawings: Where cut-outs are required in other work, provide templates, substrate preparation instructions, and directions for preparing cut-outs and for installation of anchorage devices.

1.4. QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Contractor Responsibility: In case of ambiguities, discrepancies or irregularities in the drawings, specifications, manufacturer's instructions, site conditions, or applicable codes and standards; request clarification from the Architect before proceeding. The cost of correcting work done as a result of proceeding without obtaining clarification will be borne solely by the Contractor.

B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

C. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.

1.5 PROJECT CONDITIONS

A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:

1. American Specialties, Inc. (ASI)
2. Bobrick Washroom Equipment, Inc.

3. Bradley Corporation.
4. General Accessory Manufacturing Co. (GAMCO)
5. McKinney / Parker.

2.2 MATERIALS, GENERAL

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish 22 gage (.034-inch) minimum thickness, unless otherwise indicated.

B. Sheet Steel: Cold rolled, commercial quality ASTM A 366, 20-gage (.040-inch) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

C. Galvanized Steel Sheet: ASTM A 527, G60.

D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

E. Mirror Glass: Nominal 6.0 mm (0.23 inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.

F. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

G. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

H. Keys: Unless otherwise indicated, provide universal keys for access to toilet accessory units requiring internal access for servicing, re-supply, etc. Provide minimum of six (6) keys to Owner's representative and obtain receipt.

2.3 GRAB BARS

A. Stainless Steel Type: Provide grab bars with wall thickness not less than 18 gage (.050-inch) and as follows:

1. Bobrick B-9806 series, in sizes and shapes shown on the drawings. Refer to drawings for sizes, locations and quantities. Fino Collection
   a. Mounting: Concealed, manufacturer's standard flanges and anchorages.
   b. Clearance: 1-1/2" clearance between wall surface and inside face bar.
   c. Gripping Surfaces: Manufacturer's standard non-slip sanitary safety grip finish.
   d. Heavy-Duty Series: Outside diameter of 1-1/2 inches.
2. Color: Stainless Steel
3. See drawings for quantities and locations.
   a. Provide rear, side and vertical grab bars for accessible toilet stalls as shown on plans and interior elevations. (4) Toilet Stall Locations

b. Provide (2) 42" horizontal side wall grab bars and (2) 18" vertical grab bars in each ambulatory toilet stall adjacent to the handicapped stalls in each multi fixture toilet room. (2) Toilet Stall Locations. (total of 4 horizontal and 4 vertical grab bars to be provided). Mount grab bars on each side of ambulatory stall per the typical Floor Mount Water

2.5 MIRROR

A. Surface mounted mirror, Bradley 7B1-0024360, 24" x 36".
   1. Quantity: (6)

B. Surface mounted mirror, Bradley 7B1-2024360, 24" x 36" with shelf
   1. Quantity: (2)

2.4 UTILITY SHELF AND MOP HOOKS

A. Stainless Steel Utility Shelf with Utility Hooks and Mop Strip, Bobrick B-239, 34".

1. Quantity: (1) (Custodian 217)

2.9 SANITARY NAPKIN DISPOSAL UNIT

A. Surface mounted stainless steel, Bobrick B-270.

1. Surface mounted type: with seamless exposed walls; self closing top cover; continuous hinge; and removable, reusable receptacle.
2. Quantity: (9)

2.10 BABY CHANGING STATION

A. Horizontal unit that opens folding down from stored position and with child protection strap, Bobrick KB-300-01 (Grey).

1. Quantity: (2)

2.5 FABRICATION

A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item by either a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product model number.

B. Surface-Mounted toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install toilet accessory units in accordance with manufacturer's instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verity that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10 2800

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BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A This Section includes the following:

1. General Plumbing Requirements specifically applicable to all Division 22 Sections.
2. Some piping material and installation instructions common to most piping systems.
3. Grout.
4. Plumbing Demolition (when indicated on the drawings).
5. Equipment installation requirements common to equipment sections.
6. Concrete bases.
7. Supports and anchorages.

1.3 DEFINITIONS

A Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.

1. Any item listed as furnished shall also be installed, unless otherwise noted.
2. Any item listed as installed shall also be furnished, unless otherwise noted.

1.4 REFERENCES AND STANDARDS:

A The editions recognized by latest adobted versions of the following are hereby included in and made a part of Division 22:

1. National Fire Protection Association
2. Underwriters' Laboratories, Inc.
3. National Electrical Manufacturer's Association
4. National Electric Code
5. American Society of Mechanical Engineers
6. American Welding Society
7. American National Standards Institute
8. American Gas Association
9. Hydronics Institute
10. Occupational Safety and Health Act
11. American Water Works Association

12. Cast Iron Soil Pipe Institute

1.5 QUALITY ASSURANCE AND COORDINATION

A Contractor's Responsibility Prior to Submitting Pricing Data:
1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.
2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor's risk.

B Electrical Characteristics for Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at no cost to the owner. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

C Compliance with Codes, Laws, Ordinances:
1. Conform to all requirements of the Codes, Laws, Ordinances and other regulations having jurisdiction.
2. Conform to all State Codes.
3. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
4. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
5. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
6. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.
7. All work to meet in-force local plumbing code. In the case of discrepancies between the project contract documents and the in-force local code, the most stringent shall govern.

D Engineer or plumbing staff shall walk through and inspect all plumbing work prior to walls or ceilings being closed up, deficiencies shall be noted and given to the project manager in writing. Notify Engineer when project is ready for above ceiling inspection.

E All materials and installations shall meet applicable FM Global requirements.

F Permits, Fees, Taxes, Inspections:
1. Procure all applicable permits and licenses.

2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
3. Pay all charges for permits or licenses.
4. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
5. Pay all charges arising out of required inspections by an authorized body.
6. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
7. It is the sole responsiblity of the contractor to obtain and procure permits. The Engineer is not liable for any costs associated with delays associated with permitting or obtaining permits under this division. The engineer at times may submit the plumbing permit in advance to help with project timeline. However, this fact does not relieve the installing contractor(s) from tracking and ensuring permitting proccess is being completed.
8. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter's Laboratories, Inc.

G Utility Company Requirements:
1. Secure from the appropriate private or public utility company all applicable requirements.
2. Comply with all utility company requirements.
3. Make application for and pay for service connections, such as gas.
4. Make application for and pay for all meters and metering systems required by the utility company.

H Examination of Drawings:
1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.
3. Scaling of the drawings is not sufficient or accurate for determining these locations.
4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.

I Field Measurements:
1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.

J Electronic Media/Files:
1. Construction drawings for this project have been prepared utilizing Revit or Cadd platforms

2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by Engineer.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by Engineer for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by Engineer as to the accuracy or correctness of the information provided. Engineer accepts no responsibility or liability for the Contractor's use of these documents.

1.6 SUBMITTALS

A Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

B General Submittal Procedures: In addition to the provisions of Division 1, the following are required:

1. Transmittal: Each transmittal shall include the following:
   a. Date
   b. Project title and number
   c. Contractor's name and address
   d. Division of work (e.g., plumbing, heating, ventilating, etc.)
   e. Description of items submitted and relevant specification number
   f. Notations of deviations from the contract documents
   g. Other pertinent data
2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
   a. Date
   b. Project title and number
   c. Architect/Engineer
   d. Contractor and subcontractors' names and addresses
   e. Supplier and manufacturer's names and addresses
   f. Division of work (e.g., plumbing, heating, ventilating, etc.)
   g. Description of item submitted (using project nomenclature) and relevant specification number
   h. Notations of deviations from the contract documents
   i. Other pertinent data
   j. Provide space for Contractor's review stamps
3. Composition:
   a. Submittals shall be submitted using specification sections and the project nomenclature for each item.

b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
c. All sets shall contain an index of the items enclosed with a general topic description on the cover.

4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
5. Contractor’s Approval Stamp:
   a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
   b. Unstamped submittals will be rejected.
   c. The Contractor’s review shall include, but not be limited to, verification of the following:
      1) Only approved manufacturers are used.
      2) Addenda items have been incorporated.
      3) Catalog numbers and options match those specified.
      4) Performance data matches that specified.
      5) Electrical characteristics and loads match those specified.
      6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
      7) Dimensions and service clearances are suitable for the intended location.
      8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
      9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).
   d. The Contractor shall review, stamp and approve all subcontractors’ submittals as described above.
   e. The Contractor’s approval stamp is required on all submittals. Approval will indicate the Contractor’s review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.
6. Submittal Identification and Markings:
   a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
   b. The Contractor shall clearly indicate the size, finish, material, etc.
   c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.

d. All marks and identifications on the submittals shall be unambiguous.

7. Schedule submittals to expedite the project. Coordinate submission of related items.
8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
9. Reproduction of contract documents alone is not acceptable for submittals.
10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
11. Submittals not required by the contract documents may be returned without review.
12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
13. Submittals shall be reviewed and approved by the Architect/Engineer before
    a. releasing any equipment for manufacture or shipment.
14. Contractor’s responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer’s approval.

C Electronic Submittal Procedures:

1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
    a. Submittal file name: 2024-057SD 23 XX XX description.pdf
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be transmitted via a pre-approved method.

1.7 CHANGE ORDERS

A A detailed material and labor takeoff shall be prepared for each change order, along with labor rates and markup percentages. Change orders with inadequate breakdown will be rejected.

B Change order work shall not proceed until authorized.

1.8 DELIVERY, STORAGE, AND HANDLING

A Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

C Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions. Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.

D Coordinate the installation of heavy and large equipment with the Construction Manager or General Contractor. If the Mechanical Contractor does not have prior documented experience

in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.

E Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.9 WARRANTY

A Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship from date of substantial completion.

B Provide 24 month warranty, unless otherwise noted, to the owner for all pumps, pressure boosters, sumps, dewatering.

C The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

D Warranty requirements shall extend to correction, without cost to the Owner, of all Work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from defects or nonconformance with contract documents.

1.10 INSURANCE

A Contractor shall maintain insurance coverage of a minimum of 5 Million.

1.11 COORDINATION

A Contractor shall coordinate the work of the different trades so that interference between piping, equipment, structural, and electrical work will be avoided. All necessary offsets in piping and ductwork, and all fittings, and other components, required to install the work properly shall be furnished complete in place at no additional cost.

B Unless otherwise stipulated under a particular heading, the following rules relative to responsibilities of the Contractors and Subcontractors will apply:

1. Make-up water piping connections shall be provided by the Plumbing Contractor to within five (5) feet of the required point of connection to the equipment and there terminated with a shut-off valve. Each trade shall make the final connection to the equipment it installs.
2. Ceiling access panels will be installed by the General Contractor at locations determined by the Plumbing Contractor.
3. The Plumbing Contractor or subcontractor shall install all roughing-in pertaining to his trade for each item of equipment furnished under another Section of the Specifications or by the Owner.
4. The Plumbing Contractor shall make final connections of equipment to rough-ins.

1.12 MATERIAL SUBSTITUTION

A Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.

B Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.

C Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better

than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.

D This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.

E This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.

F All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

1.13 TESTING AND REPAIR

A All piping and systems shall be thoroughly cleaned and flushed prior to final testing.

B Pressure testing shall be completed for the following piping systems:

1. Domestic water, sanitary and vent, storm and gas piping systems, and other systems as noted on the plans.

C All testing must be witnessed and accurately recorded noting methods of testing, times, dates, and results.

D Any damage as a result of tests shall be repaired or damaged materials replaced at no cost to the Owner.

1.14 FINAL COMPLETION

A All work shall be cleaned prior to issuance of Substantial Completion.

B Retouch or repaint factory painted prime and finish coats where scratched or damaged.

C Deliver any equipment as required by this Specification to Owner and obtained signed receipts of delivery.

D Clean equipment, restore damaged materials, and leave the Work in acceptable condition.

E Remove all site tools, equipment, surplus materials and rubbish continuously at no additional cost to the Owner.

F Contractor shall submit written certificates warranting each item of equipment.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS:

A All equipment and materials shall be furnished in strict accordance with the equipment named and according to Specification requirements. Each bid shall be based upon one of the materials or manufacturers specified.

B Equipment and materials specified shall be considered to have prior approval, but submittal for approval is required. Furnish construction drawings to other Contractors when required to coordinate construction.

C Where multiple manufacturers are named the drawings and specifications are based on the requirements and layouts for the equipment of the first named manufacturer. Any change required by the use of other named manufacturers such as revisions to foundations, bases, piping, controls, wiring, openings, and appurtenances shall be made by the Contractor at no additional cost to the Owner.

2.2 PIPE, TUBE, AND FITTINGS - GENERAL

A Refer to individual Division 22 Piping Sections for pipe, tube, and fitting materials and joining methods.

B Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 GROUT

A Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.

1. Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

A All materials and/or equipment shall be installed per manufacturer's recommendations and instructions.

B When temporary water is required, an approved backflow device shall be used and testing reports from device shall be sent to plumbing foreman for verification.

C Install piping according to the following requirements and Division 22 Sections specifying piping systems.

D Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

E Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

F Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

G Piping shall not project beyond walls or steel lines nor shall it hang below slabs more than is absolutely necessary. Particular attention shall be paid to the required clearances.

H Offset piping where required to avoid interference with other work, to provide greater headroom or clearance, or to conceal pipe more readily. Offsets shall be properly drained or trapped where necessary.

I Provide swing joints and expansion bends wherever required to allow the piping to expand without undue stress to connections or equipment.

J Exposed piping around fixtures or in other conspicuous places shall not show tool marks at fittings.

K Isolate pipe from the building construction to prevent transmission of vibration to the structure and to eliminate noise.

L Install piping such that any equipment connected to piping may be removed by disconnecting two (2) flanges or unions and removing only one or two pipe sections. All equipment shall have bolted or screwed flanges or unions at pipe connections.

M Install fittings for changes in direction and branch connections. T-drill system for mechanically formed tee connections and couplings, and Victaulic hole cut piping system are not allowed.

N Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment.

O Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

P Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

Q Install piping to permit valve servicing.

R Install piping at indicated slopes.

S Install piping free of sags and bends.

T Install piping to allow application of insulation.

U Eccentric reducing couplings shall be provided in all cases where air or water pockets would otherwise occur due to a reduction in pipe size.

V Cap and plug all openings in pipes during construction with suitable metal plugs or cap to keep out dirt and rubbish until equipment is connected.

W Install drains, consisting of a tee fitting, NPS 3/4 full port-ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

X Select system components with pressure rating equal to or greater than system operating pressure.

Y Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

Z Verify final equipment locations for roughing-in.

AA AA. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

BB BB. Provide proper access to materials and equipment that require inspection, repair, service, or maintenance.

CC CC. Minimum service access size for materials equipment/components above ceilings shall be 24" square.

DD All piping sized utililizing copper pipe as the base material. Installating contractor shall upsize piping according to ensure equal pressure drop. Changes to plumbing system to increase flow and reduce pressure drop to meet design shall be at the sole cost of the installing contractor.

3.2 PIPING JOINT CONSTRUCTION

A Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

B Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.3 PIPING CONNECTIONS

A Pipe sizes indicated shall be carried full size to equipment served. Any change of size to match equipment connection shall be made within one foot of the equipment. At temperature control valves with sizes smaller than connected lines, reduction shall be made immediately adjacent to valves.

3.4 EXCAVATION, FILL, BACKFILL, COMPACTION

A General:

1. Prior to the commencement of any excavation or digging, the Contractor shall verify all underground utilities with the regional utility locator. Provide prior notice to the locator before excavations. Contact information for most regional utility locaters can be found by

calling 811.

2. The Contractor shall do all excavating, filling, backfilling and compacting associated with his work.

B Excavation:

1. Make all excavations to accurate, solid, undisturbed earth, and to proper dimensions.
2. Where excavations are made in error below foundations, concrete of same strength as specified for the foundations or thoroughly compacted sand-gravel fill, as determined by the Architect/Engineer, shall be placed in such excess excavations. Place thoroughly compacted, clean, stable fill in excess excavations under slabs on grade, at the Contractor's expense.
3. Trim bottom and sides of excavations to grades required for foundations.
4. Protect excavations against frost and freezing.
5. Take care in excavating not to damage surrounding structures, equipment or buried pipe. Do not undermine footing or foundation.
6. Perform all trenching in a manner to prevent cave-ins and risk to workmen.
7. Where original surface is pavement or concrete, the surface shall be saw cut to provide clean edges and assist in the surface restoration.
8. Where satisfactory bearing soil for foundations is not found at the indicated levels, the Architect/Engineer or their representative shall be notified immediately, and no further work shall be done until further instructions are given by the Architect/Engineer or their representative.

C Dewatering:

1. Contractor shall furnish, install, operate and remove all dewatering pumps and pipes needed to keep trenches and pits free of water to complete their work.

D Underground Obstructions:

1. Known underground piping, foundations, and other obstructions in the vicinity of construction are shown on the drawings. Use great care in making installations near underground obstruction.
2. If objects not shown on the drawings are encountered, remove, relocate, or perform extra work as directed by the Architect/Engineer.

E Fill and Backfilling:

1. No rubbish or waste material is permitted for fill or backfill.
2. Provide all necessary sand for backfilling.
3. Dispose of the excess excavated earth as directed.
4. Backfill materials shall be suitable for required compaction, clean and free of perishable materials and stones greater than 4 inches in diameter. Water shall not be permitted to rise in unbackfilled trenches. No material shall be used for backfilling that contains frozen earth, debris or earth with a high void content.
5. Backfill all trenches and excavations immediately after installing pipes, or removal of forms, unless other protection is provided.
6. Around piers and isolated foundations and structures, backfill and fill shall be placed and consolidated simultaneously on all sides to prevent wedge action and displacement. Fill and backfill materials shall be spread in 6 inch uniform horizontal layers with each layer compacted separately to required density.
7. Lay all piping on a compacted bed of sand at least 3 inches deep. Backfill around pipes with sand, 6 inch layers, and compact each layer.

8. Use sand for backfill up to grade for all piping under slabs or paved areas. All other piping shall have sand backfill to 6 inches above the top of the pipe.
9. Place all backfill above the sand in uniform layers not exceeding 6 inches deep. Each layer shall be placed, then carefully and uniformly tamped, to eliminate lateral or vertical displacement.
10. Where the fill and backfill will ultimately be under a building, floor or paving, each layer of fill shall be compacted to 95% of the maximum density determined by AASHTO Designation T-99 or ASTM Designation D-698. Moisture content of soil at time of compaction shall not exceed plus or minus 2% of optimum moisture content determined by AASHTO T-99 or ASTM D-698 test.

F Surface Restoration:

1. Where trenches are cut through graded, planted or landscaped areas, the areas shall be restored to the original condition. Replace all planting removed or damaged to its original condition. A minimum of 6 inches of topsoil shall be applied where disturbed areas are to be seeded or sodded.
2. Concrete or asphalt type pavement, seal coat, rock, gravel or earth surfaces removed or damaged shall be replaced with comparable materials and restored to original condition.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C Install Plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D Install equipment to allow right of way for piping installed at required slope.

3.6 CONCRETE BASES

A Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit. Install dowel rods to connect concrete base to concrete floor.
2. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section “Cast-in-Place Concrete”

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A Refer to Division 05 Section "Metal Fabrications" for structural steel.

B Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor Plumbing materials and equipment.
C Field Welding: Comply with AWS D1.1.

3.8 GROUTING
A Mix and install grout for Plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
B Clean surfaces that will come into contact with grout.
C Provide forms as required for placement of grout.
D Avoid air entrapment during placement of grout.
E Place grout, completely filling equipment bases.
F Place grout on concrete bases and provide smooth bearing surface for equipment.
G Place grout around anchors.
H Cure placed grout.

3.9 PROJECT CLOSEOUT
A The following paragraphs supplement the requirements of Division 1.
B Final Jobsite Observation:
1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
3. Upon Contractor certification that the project is complete and ready for a final observation, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
4. It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineer’s additional time and expenses will be deducted from the Contractor’s contract retainage prior to final payment at the completion of the job.
C Before final payment is authorized, this Contractor must submit the following:
1. Operation and maintenance manuals with copies of approved shop drawings.
2. Record documents including marked-up or reproducible drawings and specifications.
3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
4. Inspection by State Boiler Inspector.
5. Start-up reports on all equipment requiring a factory installation inspection or start- up.
6. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.10 OPERATION AND MAINTENANCE MANUALS
A General:
1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer’s review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer’s comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.

2. Approved O&M manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.

B Electronic Submittal Procedures:

1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
   a. O&M file name: O&M.div22.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be divided into files that are clearly labeled as “1 of 2”, “2 of 2”, etc.
6. Provide the Owner with an approved copy of the O&M manual in digital format which is tabbed and bookmarked accordingly.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C Operation and Maintenance Instructions shall include:

1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
3. Copies of all final approved shop drawings and submittals. Include Architect’s/Engineer’s shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test and balance reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.

14. List of lubricants in all equipment and recommended frequency of lubrication.
15. Instruction books, cards, and manuals furnished with the equipment.

3.11 RECORD DOCUMENTS

A The following paragraph supplements Division 1 requirements:
1. Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.

B Mark drawings to indicate revisions to piping and plumbing systems size and location, both exterior and interior.

C Before completion of the project, a set of reproducible mechanical drawings will be given to the Contractor for transfer of all as-built conditions from the paper set maintained at the job site. All marks on reproducibles shall be clear and permanent.

D Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.

E Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.

F Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

END OF SECTION 220500

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METERS AND GAUGES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Pressure gauges.
- B Thermometers.
- C Pressure-temperature test plugs.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
- B ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2020).
- C ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).
- D UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.
- E UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.

1.4 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide red-marked product data sheets for each furnished item with associated components and accessories.

PART 2 PRODUCTS

2.1 PRESSURE GAUGES
- A Pressure Gauges: 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: Stainless Steel casing with brass or stainless burbon tube sensor.
  2. Size: 3-1/2 inch diameter.
  3. Mid-Scale Accuracy: One percent.
  4. Scale: Psi.
  5. Liquid Filled: Glycerine

2.2 THERMOMETERS
- A General:
  1. Product Compliance: ASTM E1.
  2. Lens: Clear glass, except where stated.
  3. Accuracy: One percent, when tested in accordance with ASTM E77, except where stated.
  4. Scale: Black markings depicting single scale in degrees F where expected process value falls half-span of standard temperature range.
- B Thermometers - Adjustable Angle: 7 inch v-shape aluminum case with clear glass window scale, 6 inch NPT stem, red or blue organic non-toxic liquid filled glass tube, and adjustable joint with positive locking device allowing 360 degrees in horizontal plane or 180 degrees in vertical plane adjustments.
- C Thermometers - Dial Type:
  1. Fixed: 5 inch diameter dial with black pointer, stainless steel case, silicone damping bimetal element, hermetically sealed lens, recalibrating screw, and 2-1/2 inch NPT stem.

2.3 PRESSURE-TEMPERATURE TEST PLUGS:

A Size: 500 psi capacity; 1/2 inch MPT brass fitting with gasket, cap, and retaining strap for 1/8 inch pressure gauge or temperature probe.

B Wetted Materials per Temperature Range:

1. Up to 200 degrees F: Brass probe with neoprene core.

PART 3 EXECUTION

3.1 EXAMINATION

A Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports, and test plugs.

3.2 INSTALLATION

A Install pressure gauges as follows:

1. At Pumps: Place single gauge before strainer, suction side and discharge side.
2. Include gauge cock to isolate each gauge and extend nipples for insulation clearance.

B Install thermometers as follows:

1. Hot Water Heaters: Place upstream and downstream of heater. Add one on the inlet end when using steam as the water heating medium.

END OF SECTION 220519

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Nameplates.
- B Tags.
- C Stencils.
- D Pipe markers.
- E Underground warning tape.
- F Ceiling tacks.

1.2 RELATED REQUIREMENTS
- A Section 099123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS
- A ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.

1.4 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE
- A Nameplates:
  1. Heat exchangers, water heaters, and other heat transfer products.
  2. Control panels, transducers, and other related control equipment products.
- B Stencil:
  1. Piping: 3/4 inch diameter and higher.
  2. Heat exchangers, water heaters, and other heat transfer products.
  3. Ceiling tacks placed on lay-in ceiling surface to reference plumbing components.
- C Pipe Markers: 3/4 inch diameter and higher.

2.2 NAMEPLATES
- A Description: Laminated piece with up to three lines of text.
  1. Letter Color: White.
  2. Letter Height: 1/4 inch.

2.3 TAGS
- A Manufacturers:
- B Flexible: Vinyl with engraved black letters on light contrasting background color with up to three lines of text. Minimum tag size 1-1/2 inch in diameter.

2.4 STENCILS
- A Pipe: Stencil size required per external insulated or uninsulated pipe diameter.
  1. 3/4 to 1-1/4 inch Range: 1/2 inch text over 8 inch long background.
  2. 1-1/2 to 2 inch Range: 3/4 inch text over 8 inch long background.
  3. 2-1/2 to 6 inch Range: 1-1/4 inch text over 12 inch long background.
  4. 8 to 10 inch Range: 2-1/2 inch text over 24 inch long background.
  5. Over 10 inches: 3-1/2 inch text over 32 inch long background.
- B Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.
- C Fluid Service Identification Scheme, ASME A13.1:
  1. Water; Potable, Cooling, Boiler Feed and Other: White text on green background.

2.5 PIPE MARKERS
- A Manufacturers:
- B Comply with ASME A13.1.
- C Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
- D Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- E Identification Scheme, ASME A13.1:
  1. Primary: External Pipe Diameter, Uninsulated or Insulated.
     a. 3/4 to 1-1/4 inches: Use 8 inch field-length with 1/2 inch text height.
     b. 1-1/2 to 2 inches: Use 8 inch field-length with 3/4 inch text height.
     c. 2-1/2 to 6 inches: Use 12 inch field-length with 1-1/4 inch text height.
     d. 8 to 10 inches: Use 24 inch field-length with 2-1/2 inch text height.
  2. Secondary: Color scheme per fluid service.
     a. Combustible Fluids: White text on brown background.
     b. Compressed Air: White text on blue background.
     c. Fire Quenching Fluids: White text on red background.
     d. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.
  3. Tertiary: Other Details.
     a. Directional flow arrow.

2.6 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 wide, with minimum thickness of 5 mil, 0.005 inch, unless otherwise required for proper detection.
- C Legend: Type of service, continuously repeated over full length of tape.
- D Color:

2.7 CEILING TACKS
- A Description: Steel with 3/4 inch diameter color coded head.
- B Color code as follows:
  1. Plumbing Equipment: Yellow.
  2. Plumbing Valves: Green.
  3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION
- A Degrease and clean surfaces to receive identification products.

3.2 INSTALLATION
- A Apply stencil painted identification in compliance with Section 099123 requirements. Identify unit with assigned id-number and area being served using pipe marking rules.
- B Install plastic pipe markers in accordance with manufacturer's instructions.
- C Apply ASME A13.1 Pipe Marking Rules:
  1. Place pipe marker adjacent to changes in direction.
  2. Place pipe marker adjacent each valve port and flange end.
  3. Place pipe marker at both sides of floor and wall penetrations.
  4. Place pipe marker every 25 to 50 feet interval of straight run.

D Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION 220553

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PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Glass fiber insulation.
- B Jacketing and accessories.

1.2 RELATED REQUIREMENTS
- A Section 078400 - Firestopping.

1.3 REFERENCE STANDARDS
- A ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- B ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
- C ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).
- D ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
- E ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- F ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- G ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
- H UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 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 that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE
- A Manufacturer Qualifications: Company specializing in manufacturing the Products 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 5 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING
- A Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS
- A Maintain ambient conditions required by manufacturers of each product.
- B Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 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.

2.2 GLASS FIBER INSULATION

A Manufacturers:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville Corporation: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.

B Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
1. K Value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

C Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm.

D Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E Vapor Barrier Lap Adhesive: Compatible with insulation.

F Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

G Insulating Cement: ASTM C449.

H PVC fitting covers

2.3 JACKETING AND ACCESSORIES

A PVC Plastic Jacket:
1. Manufacturers:
2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
   a. Minimum Service Temperature: 0 degrees F.
   b. Maximum Service Temperature: 150 degrees F.
   c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
   d. Thickness: 10 mil, 0.010 inch.
   e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that piping has been tested before applying insulation materials.

B Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C Exposed Piping: Locate insulation and cover seams in least visible locations.

D Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

E Glass fiber insulated pipes conveying fluids below ambient temperature:
1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

H Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

I Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert Location: Between support shield and piping and under the finish jacket.
4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

J Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.

3.3 SCHEDULES

A Insulation of Piping shall be in accordance with table C403.12.3 of the IECC 2021 addition

B Domestic Hot Water and Recirculated Domestic Hot Water

1. Pipe Size up to 1 1/2" = 1" Insulation
2. Pipe Size Over 1 1/2" to 8" = 1.5" Insulation

C Domestic Cold Water

1. Pipe Size up to 1 1/2" = 1/2" Insulation
2. Pipe Size Over 1 1/2" to 8" = 1.0" Insulation

END OF SECTION 220719

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PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A Sanitary waste piping, above grade.
B Domestic water piping, above grade.
C Pipe hangers and supports.
D Ball valves.
E Strainers.

1.2 RELATED REQUIREMENTS

A Section 220529 - Hangers and Supports for Plumbing Piping and Equipment.
B Section 220553 - Identification for Plumbing Piping and Equipment.
C Section 220719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

A ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
B ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
C ASME B31.9 - Building Services Piping; 2020.
D ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.
E ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
F ASTM B32 - Standard Specification for Solder Metal; 2020.
G ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
H ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
I ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
J ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.
K ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
L ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.
M ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
N ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
O AWWA C651 - Disinfecting Water Mains; 2014, with Addendum (2020).
P CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
Q CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.
R ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).
S ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).

T ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).
U ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.
V MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
W MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .
X NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
Y NSF 372 - Drinking Water System Components - Lead Content; 2022.
Z UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 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 Welders' Certificates: Submit certification of welders' compliance with ASME BPVC-IX.
D Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.5 QUALITY ASSURANCE
A Perform work in accordance with applicable codes.
B Valves: Manufacturer's name and pressure rating marked on valve body.
C Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.
D Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.
E Mechanical Coupling for grooved installations shall have a labor and material warranty for 10 years. Including insurance for damaged caused by failure of 1 Million.
F All plumbing piping has been sized by engineer utilzing copper domestic water piping. All other materials being utilized its the sole responsibility of the installing contractor to verify pipe pressure loss and upsize piping and fittings accordingly to match design pressure loss of the system.

1.6 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.

1.7 FIELD CONDITIONS
A Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 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.

B Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY WASTE PIPING, ABOVE GRADE

A Cast Iron Pipe: CISPI 301, hubless, service weight.
1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B PVC Pipe: ASTM D2665.
1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 DOMESTIC WATER PIPING, ABOVE GRADE

A Copper Pipe: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B32, alloy Sn95 solder.
3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.
   a. Manufacturers:
      1) Anvil International: www.anvilintl.com/#sle.
      2) FNW; Copper Press: www.fnw.com/#sle.
      3) Viega Propress.

2.4 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.
4. Vertical Pipe Support: Steel riser clamp.
5. Rooftop Supports for Low-Slope Roofs: Steel pedestals with 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; and as follows:
   a. Bases: High-density polypropylene.
   b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   c. Steel Components: Stainless steel or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   d. Attachment and Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion-resistant material.
   e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

B Plumbing Piping - Drain, Waste, and Vent:
1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
4. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.

C Plumbing Piping - Water:
1. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.

2. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
3. Hangers for Hot Pipe Sizes 6 inch and Larger: Adjustable steel yoke, cast iron pipe roll, double hanger.
4. Wall Support for Pipe Sizes 4 inch and Larger: Welded steel bracket and wrought steel clamp.

D Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Comply with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Comply with ICC-ES AC01.
3. Concrete Screw Type Anchors: Comply with ICC-ES AC193.
4. Masonry Screw Type Anchors: Comply with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Comply with ICC-ES AC308.

2.5 BALL VALVES

A Manufacturers:
1. Anvil International: www.anvilintl.com/#sle.
2. Apollo Valves: www.apollovalves.com/#sle.
3. Grinnell Products: www.grinnell.com/#sle.
4. Uponor, Inc: www.uponorengineering.com/#sle.
5. Viega
6. Victaulic

B Construction, 4 inch and Smaller: MSS SP-110, Class 150, 600 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

2.6 STRAINERS

A Size 2 inch and Smaller:
1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

B Size 1-1/2 inch to 4 inch:
1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that excavations are to required grade, dry, and not over-excavated.

3.2 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.

3.3 INSTALLATION

A Install in accordance with manufacturer's instructions.
B Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
C Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
D PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

E Sleeve pipes passing through partitions, walls, and floors.

F Inserts:
1. Provide inserts for placement in concrete formwork.

G 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 space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

H When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.4 APPLICATION

A Use grooved mechanical couplings and fasteners only in accessible locations.

B Install unions downstream of valves and at equipment or apparatus connections.

C Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

D Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

E Install ball valves for throttling, bypass, or manual flow control services.

F Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.

G Provide spring-loaded check valves on discharge of water pumps.

H Provide flow controls in water recirculating systems where indicated.

3.5 TOLERANCES

A Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

B Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.6 FIELD TESTS AND INSPECTIONS

A Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

B Domestic Water Systems:
1. Perform hydrostatic testing for leakage prior to system disinfection.
2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
3. General:
   a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.

C Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A Prior to starting work, verify system is complete, flushed, and clean and complys with local regulations.

B Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

D Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E Maintain disinfectant in system for 24 hours.

F If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION 221005

PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Drains.
- B Cleanouts.
- C Water hammer arrestors.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A ASME A112.6.3 - Floor Drains; 2022.
- B NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- C NSF 372 - Drinking Water System Components - Lead Content; 2022.

1.4 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- D Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

1.5 QUALITY ASSURANCE
- A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING
- A Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS
- A Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS
- A Manufacturers:
  1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
  2. Josam Company: www.josam.com/#sle.
  3. MIFAB, Inc: www.mifab.com/#sle.
  4. Zurn Industries, LLC: www.zurn.com/#sle.
  5. Sioux Chief
  6. Watts
- B Floor Drains:
- C Floor Drain:
  1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.
- D Floor Drain:
  1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable square nickel bronze strainer with removable perforated sediment bucket.

2.3 CLEANOUTS
- A Manufacturers:
  1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.

2. Josam Company: www.josam.com/#sle.
3. MIFAB, Inc: www.mifab.com/#sle.
4. Zurn Industries, LLC: www.zurn.com/#sle.Wa
5. Watts
6. Sioux Chief

B Cleanouts at Exterior Surfaced Areas:
1. Round cast nickel bronze access frame and non-skid cover.

C Cleanouts at Exterior Unsurfaced Areas:
1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D Cleanouts at Interior Finished Floor Areas:
1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

2.4 WATER HAMMER ARRESTORS

A Manufacturers:
1. Jay R. Smith Manufacturing Company: www.jrsmith.com/#sle.
2. Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com/#sle.
3. Zurn Industries, LLC: www.zurn.com/#sle.

B Water Hammer Arrestors:

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Encase exterior cleanouts in concrete flush with grade.

C Install floor cleanouts at elevation to accommodate finished floor.

D Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to Flush Valves.

END OF SECTION 221006

PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Diaphragm-type compression tanks.
- B Domestic Hot Water Recirculation Valves

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

1.4 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittals procedures.
- B Product Data:
- C Shop Drawings:
- D Manufacturer's Instructions: Indicate installation instructions.
- E Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- F Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE
- A Certifications:
  1. Water Heaters: NSF approved.

1.6 DELIVERY, STORAGE, AND HANDLING
- A Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.7 WARRANTY
- A See Section 017800 - Closeout Submittals for additional warranty requirements.
- B Manufacturer Warranty: Provide 15 year manufacturer warranty for commercial gas fired water heaters. Complete forms in Owner's name and register with manufacturer.
- C Manufacturer Warranty: Provide 5-year manufacturer warranty for domestic water heaters and water storage tanks. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 WATER HEATERS
- A Commercial Electric Water Heaters:
  1. Manufacturers:
     a. Rheem.
     b. Substitutions: See Section 016000 - Product Requirements.
  2. Type: Factory-assembled and wired, electric, vertical storage.
  3. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
  4. Performance: See Drawing Schedule
  5. Seamless, blow-molded, polybutene tank impervious to rust and corrosion.
  6. Pex dip tube
  7. Tough molded polyethylene outer shell resist dents, scrathes and salt air corrosion.
  8. Polyuethane Insulation

9. Controls: Automatic immersion water thermostat; externally adjustable temperature range from 60 to 180 degrees F, flanged or screw-in nichrome elements, high temperature limit thermostat.
10. Accessories:
    a. Water Connections: Brass.
    b. Dip Tube: Crosslink polyethylene (PEX).
    c. Drain valve.
    d. Anode: Not Required
    e. Temperature and Pressure Relief Valve: ASME labeled.
11. Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 75 W/sq in.

2.2 DIAPHRAGM-TYPE COMPRESSION TANKS

A Manufacturers:
1. Amtrol Inc: www.amtrol.com/#sle.
2. Bell & Gossett, a brand of Xylem, Inc: www.bellgossett.com/#sle.
3. Taco, Inc: www.taco-hvac.com/#sle.

B Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.

C Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psig.

D Size -
1. Provide the following sizes for each water heater tanks unless noted otherwise.
    a. Systems with water heaters less that 60 gallson. Provide Amtrol ST-5
2. Provide ST-70VC on cold water line for compression for flush valve capacity. See drawing diagram.

PART 3 EXECUTION

3.1 INSTALLATION

A Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions required for applicable certifications.

B Coordinate system, equipment, and piping work with applicable electrical, fuel, gas, vent, drain, and waste support interconnections as included or provided by other trades.

C Domestic Water Storage Tanks:
1. Provide steel pipe support, independent of building structural framing members.
2. Clean and flush prior to delivery to site. Seal until pipe connections are made.

3.2 FIELD QUALITY CONTROL

A See Section 014000 - Quality Requirements for additional requirements.

3.3 SCHEDULES - SEE DRAWINGS

END OF SECTION 223000

PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Flush valve water closets.
- B Wall hung urinals.
- C Lavatories.
- D Under-lavatory pipe supply covers.
- E Bi-level, electric water coolers.
- F Mop sinks.
- G Service sinks.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008 (Reaffirmed 2013).
- C ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- D ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.
- E ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).
- F ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018, with Errata.
- G ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.
- H ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.
- I ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.
- J ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K NSF 61 - Drinking Water System Components - Health Effects; 2023, with Errata.
- L NSF 372 - Drinking Water System Components - Lead Content; 2022.

1.4 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.

1.5 QUALITY ASSURANCE
- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 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.

1.7 WARRANTY
- A See Section 017800 - Closeout Submittals for additional warranty requirements.
- B Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

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.

2.2 REGULATORY REQUIREMENTS

A Comply with applicable codes for installation of plumbing systems.

B Perform work in accordance with local health department regulations.

2.3 FLUSH VALVE WATER CLOSETS

A Water Closets:

1. Vitreous china, ASME A112.19.2, wall hung, siphon jet flush action, china bolt caps.
2. Bowl: ASME A112.19.2; 16.5 inches high with elongated rim.
3. Flush Valve: Exposed (top spud).
4. Flush Operation: Manual, oscillating handle.
5. Handle Height: 44 inches or less.
6. Inlet Size: 1-1/2 inches.
7. Trapway Outlet: 4 inch.
8. Color: White.
9. Manufacturers:
   a. American Standard, Inc: www.americanstandard-us.com/#sle.
   b. Kohler Company:
   c. Zurn Industries, LLC:.
   d. Substitutions: See Section 016000 - Product Requirements.

B Flush Valves:

1. Valve Supply Size: 1-1/2 inches.
2. Valve Outlet Size: 1-1/2 inches.
3. Manufacturers:
   a. Sloan Valve Company:
   b. Zurn Industries, LLC:
   c. Hydrotek
4. Sensor-Operated:
   a. Type: ASME A112.19.5; chloramine-resistant clog-resistant dual-seat diaphragm valve complete with vacuum breaker, stops and accessories.
   b. Mechanism: Solenoid-operated piston or electronic motor-actuated operator with low-voltage powered infrared sensor, and mechanical override or override push button.
   c. Supplied Volume Capacity: 1.6 gal per flush.
5. Exposed Type: Chrome-plated, escutcheon, integral screwdriver stop.
6. Metering Type: Easily accessible adjustment nut.
7. Sensor and Line voltage transformer located in chase.

C Toilet Seats:

1. Manufacturers:
   a. American Standard, Inc:
   b. Bemis Manufacturing Company
   c. Church Seat Company:
   d. Olsonite:
   e. Zurn Industries, LLC:

f. Centoco
g. Substitutions: See Section 016000 - Product Requirements.

2. Plastic: Black finish, open front, extended back, self-sustaining hinge, brass bolts, with cover.

D Water Closet Carriers:

1. Manufacturers:
   a. Jay R. Smith Manufacturing Company:
   b. JOSAM Company:
   c. Zurn Industries, LLC:
   d. 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.

2.4 WALL HUNG URINALS

A Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.

1. Consumption Volume: 1.0 gal per flush, maximum.
2. Flush Valve: Exposed (top spud).
3. Flush Operation: Sensor operated.
4. Trapway Outlet: Integral.

B Flush Valves:

1. Manufacturers:
   a. Sloan Valve Company; _____: www.sloanvalve.com/#sle.
   b. Zurn Industries, LLC; ZEMS Series: www.zurn.com/#sle.
   c. Hdyrotek
2. Sensor-Operated:
   a. Type: ASME A112.19.5; chloramine-resistant, clog-resistant dual-seat diaphragm valve with vacuum breaker, stops and accessories.
   b. Mechanism: Solenoid-operated piston or electronic motor-actuated operator with low-voltage powered infrared sensor, and mechanical override or override push button.
   c. Supplied Volume Capacity: 1.0 gal per flush.

2.5 LAVATORIES

A Manufacturers:

1. American Standard, Inc: www.americanstandard-us.com/#sle.
2. Kohler Company: www.kohler.com/#sle.

B Wall-Hung Basin:

1. Vitreous China: ASME A112.19.2; white, rectangular basin with splash lip, front overflow, soap depression, and hanger. Size as indicated on drawings with 4-inch centerset spacing or single hole to match faucet.
2. Carrier:
   a. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.
   b. Manufacturers:
      1) Jay R. Smith MFG. Co: www.jrsmith.com/#sle.
      2) JOSAM Company: www.josam.com/#sle.
      3) Zurn Industries, LLC; Z1231: www.zurn.com/#sle.

C Drop-In Basin:

1. Vitreous China: ASME A112.19.2; self-rimming, white, square shape, front overflow, soap depression, seal of putty, caulking, or concealed vinyl gasket, and white finish. Size as indicated on drawings with 4-inch centerset spacing.

D Supply Faucet:
1. Deck Mounted Faucet Manufacturers:
   a. American Standard, Inc; _____: www.americanstandard-us.com/#sle.
   b. Kohler Company; _____: www.kohler.com/#sle.
   c. Sloan.
   d. Chicago Faucet
   e. Hydrotek

E Sensor Operated Faucet:
1. Cast brass, chrome plated, deck mounted with sensor located on neck of spout.
2. Spout Style: Standard.
3. Power Supply:
   a. Wired: 24 VAC with step-down dry transformer wired into line voltage.
4. Mixing Valve: External lever operated.
5. Water Supply: 3/8 inch compression connections.
6. Aerator: Vandal resistant, 0.5 gpm, laminar flow device.
7. Automatic Shut-off: 10 seconds.
8. ASSE 1070 Approved
9. Sensor Range: Factory set at 3 inch adjustable up to 24 inch.
10. Sensor Range: Automatically adjusts.
11. Finish: Polished chrome.
12. Lead Content: Extra low; maximum 0.25 percent by weighed average.
13. Manufacturers:
    a. American Standard, Inc: www.americanstandard-us.com/#sle.
    b. Sloan Valve Company: www.sloanvalve.com/#sle.
    c. Watts: www.watts.com/#sle.
    d. Zurn Industries, LLC: www.zurn.com/#sle.

F Thermostatic Mixing Valve:
1. ASSE 1070 listed with combination stop, strainer, and check valves, and flexible stainless steel connectors.
2. Slip-joint P-trap.
3. Braided hot and cold water supply lines.
4. Chrome plated 17 gauge, 0.0538 inch brass P-trap with clean-out plug and arm with escutcheon.

2.6 UNDER-LAVATORY PIPE SUPPLY COVERS

A Manufacturers:
1. Plumberex Specialty Products, Inc: www.plumberex.com/#sle.

B Basis of Design: Plumberex Specialty Products, Inc; www.plumberex.com/#sle.
1. Under-Lavatory Covers with Snap-Lock Fasteners (Molded): Plumberex Pro-Extreme.

C 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 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.

2.7 BI-LEVEL, ELECTRIC WATER COOLERS

A Manufacturers:
1. Elkay Manufacturing Company: www.elkay.com/#sle.
2. Haws Corporation: www.hawsco.com/#sle.
3. Murdock Manufacturing, Inc: www.murdockmfg.com/#sle.
4. Oasis International: www.oasiscoolers.com/#sle.

B Water Cooler: Bi-level, electric, mechanically refrigerated; surface mounted, ADA compliant; stainless steel top, vinyl on steel body, elevated anti-squirt bubbler with stream guard, automatic stream regulator, push button, mounting bracket; integral air cooled condenser and stainless steel grille.
1. Capacity: 8 gph of 50 degrees F water with inlet at 80 degrees F and room temperature of 90 degrees F, when tested in accordance with ASHRAE Std 18.
2. Electrical: 115 VAC, 60 Hertz compressor, 6 foot cord and plug for connection to electric wiring system including grounding connector.
3. Inline filter and visible status.

C Bottle Filler: Materials to match fountain.

2.8 MOP SINKS

A Terrazzo Mop Sink Manufacturers:
1. Acorn Engineering Company: www.acorneng.com/#sle.
2. Fiat.

B Material: Precast terrazzo composed of marble chips cast in Portland cement.
C Type: Rectilinear, standard height.
D Tiling Flange Construction: Galvanized steel.
E Grid strainer: Stainless steel; integral; removable.
F Dimensions: As indicated on drawings.
G Accessories:
1. 3 feet of 1/2 inch diameter plain end reinforced rubber hose.
2. Hose clamp hanger.
3. Mop hanger.
4. Chicago 897 commercial faucet with pail hook and wall bracket or FIat 830AA00

2.9 SERVICE SINKS

A Manufacturers:
1. FIAT FL-1.

B Self-Standing, Single-Bowl, Laundry Sink: Two-hole, white finished, Molded Stone bowl, 20 gal capacity with integral-molded drain and stopper. Size as indicated on drawings.
C Two-Lever Handle Service Faucet:
1. Type: Deck-mount spout faucet with union inlets and mounting plate.
2. Spray Type: Full stream spray at 1.8 gpm, maximum.
3. ASME A112.18.1, ADA Standards, and NSF 61 compliant assembly.
4. Materials: Ceramic disc cartridge valve on brass body with polished chrome finish.
5. Products:
a. Chicago Faucet 891-L8BVB

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that walls and floor finishes are prepared and ready for installation of fixtures.

3.2 PREPARATION

A Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A Install each fixture with trap, easily removable for servicing and cleaning.

B Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C Install components level and plumb.

D Install and secure fixtures in place with wall supports and bolts.

E Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

A Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A Clean plumbing fixtures and equipment.

3.7 PROTECTION

A Protect installed products from damage due to subsequent construction operations.

B Do not permit use of fixtures by construction personnel.

C Repair or replace damaged products before Date of Substantial Completion.

3.8 SCHEDULES

A Fixture Rough-In

1. Water Closet (Flush Valve Type):
   a. Cold Water: 1 Inch.
   b. Waste: 4 Inch.
   c. Vent: 2 Inch.
2. Urinal (Flush Valve Type):
   a. Cold Water: 3/4 Inch.
   b. Waste: 2 Inch.
   c. Vent: 1-1/2 Inch.
3. Lavatory:
   a. Hot Water: 1/2 Inch.
   b. Cold Water: 1/2 Inch.
   c. Waste: 1-1/2 Inch.
   d. Vent: 1-1/4 Inch.
4. Sink:
   a. Hot Water: 1/2 Inch.
   b. Cold Water: 1/2 Inch.
   c. Waste: 1-1/2 Inch.
   d. Vent: 1-1/4 Inch.

5. Service Sink:
    a. Hot Water: 1/2 Inch.
    b. Cold Water: 1/2 Inch.
    c. Waste: 3 Inch.
    d. Vent: 1-1/2 Inch.
6. Drinking Fountain:
    a. Cold Water: 1/2 Inch.
    b. Waste: 1-1/4 Inch.
    c. Vent: 1-1/4 Inch.

END OF SECTION 224000

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BASIC HVAC REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A All materials and installation methods shall conform to the applicable standards, guidelines and codes referenced in the specification sections throughout the project manual.

1.2 DEFINITIONS

A Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene monomer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

G Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.

1. Any item listed as furnished shall also be installed, unless otherwise noted.
2. Any item listed as installed shall also be furnished, unless otherwise noted.

1.3 QUALITY ASSURANCE

A Contractor’s Responsibility Prior to Submitting Pricing Data:

1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.
2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor’s own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor’s risk.

B Qualifications:

1. Only products of reputable manufacturers are acceptable.
2. All Contractors and subcontractors shall employ only workers skilled in their trades.

C Compliance with Codes, Laws, Ordinances:

1. Conform to all requirements of the Codes, Laws, Ordinances and other regulations having jurisdiction.
2. Conform to all State Codes.
3. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
4. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
5. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
6. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.

D Permits, Fees, Taxes, Inspections:

1. Procure all applicable permits and licenses.
2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
3. It is the sole responsiblity of the contractor to obtain and procure permits. The Engineer is not lialble for any costs associated with the cost of permits or delays associated with permitting or obtaining permits under this division. The engineer at times may submit the permit in advance to help with project timeline. However, this fact does not relieve the installing contractor(s) from tracking and ensuring permitting proccess is being completed.
4. Pay all charges for permits or licenses.
5. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
6. Pay all charges arising out of required inspections by an authorized body.
7. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
8. It is the sole responsiblity of the contractor to obtain and procure permits. The Engineer is not liable for any costs associated with delays associated with permitting or obtaining permits under this division.
9. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter’s Laboratories, Inc.

E Utility Company Requirements:

1. Secure from the appropriate private or public utility company all applicable requirements.
2. Comply with all utility company requirements.
3. Make application for and pay for service connections, such as gas.
4. Make application for and pay for all meters and metering systems required by the utility company.

F Examination of Drawings:

1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.

3. Scaling of the drawings is not sufficient or accurate for determining these locations.
4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.
8. Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
   a. Any item listed as furnished shall also be installed, unless otherwise noted.
   b. Any item listed as installed shall also be furnished, unless otherwise noted.

G Field Measurements:
1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.

H Electronic Media/Files:
1. Construction drawings for this project have been prepared utilizing Revit or Cadd platforms
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed “Electronic File Transmittal” form provided by Engineer.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by Engineer for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by Engineer as to the accuracy or correctness of the information provided. Engineer accepts no responsibility or liability for the Contractor’s use of these documents.
9. Electrical Characteristics for Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.4 SUBMITTALS

A Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

B General Submittal Procedures: The following are required:

1. Transmittal: Each transmittal shall include the following:
   a. Date
   b. Project title and number
   c. Contractor’s name and address
   d. Division of work (e.g., plumbing, heating, ventilating, etc.)
   e. Description of items submitted and relevant specification number
   f. Notations of deviations from the contract documents
   g. Other pertinent data
2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
   a. Date
   b. Project title and number
   c. Architect/Engineer
   d. Contractor and subcontractors’ names and addresses
   e. Supplier and manufacturer’s names and addresses
   f. Division of work (e.g., plumbing, heating, ventilating, etc.)
   g. Description of item submitted (using project nomenclature) and relevant specification number
   h. Notations of deviations from the contract documents
   i. Other pertinent data
   j. Provide space for Contractor’s review stamps
3. Composition:
   a. Submittals shall be submitted using specification sections and the project nomenclature for each item.
   b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
   c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
5. Contractor’s Approval Stamp:
   a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
   b. Unstamped submittals will be rejected.

c. The Contractor's review shall include, but not be limited to, verification of the following:
   1) Only approved manufacturers are used.
   2) Addenda items have been incorporated.
   3) Catalog numbers and options match those specified.
   4) Performance data matches that specified.
   5) Electrical characteristics and loads match those specified.
   6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
   7) Dimensions and service clearances are suitable for the intended location.
   8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
   9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).

d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.

e. The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.

6. Submittal Identification and Markings:
   a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
   b. The Contractor shall clearly indicate the size, finish, material, etc.
   c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
   d. All marks and identifications on the submittals shall be unambiguous.
7. Schedule submittals to expedite the project. Coordinate submission of related items.
8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
9. Reproduction of contract documents alone is not acceptable for submittals.
10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
11. Submittals not required by the contract documents may be returned without review.
12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
13. Submittals shall be reviewed and approved by the Architect/Engineer before releasing any equipment for manufacture or shipment.
14. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.

C Electronic Submittal Procedures:

1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
    a. Submittal file name: 2024-057SD 23 XX XX description.pdf
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be transmitted via a pre-approved method.

1.5 CHANGE ORDERS

A A detailed material and labor takeoff shall be prepared for each change order, along with labor rates and markup percentages. Change orders with inadequate breakdown will be rejected.

B Change order work shall not proceed until authorized.

1.6 EQUIPMENT SUPPLIERS' INSPECTION

A The following equipment shall not be placed in operation until a competent installation and service representative of the manufacturer has inspected the installation and certified that the equipment is properly installed, adjusted and lubricated; that preliminary operating instructions have been given; and that the equipment is ready for operation:
1. Base Mounted Pumps
2. Boilers, Burners and Boiler Trim
3. Water Chillers, Fluid Coolers, Central Heat Pumps

B Contractor shall arrange for and obtain supplier's on-site inspection(s) at proper time(s) to assure each phase of equipment installation and/or connection is in accordance with the manufacturer's instructions.

C Submit copies of start-up reports to the Architect/Engineer and include copies of Owner’s Operation and Maintenance Manuals.

1.7 PRODUCT DELIVERY, STORAGE, HANDLING & MAINTENANCE

A Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions. Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.

B Coordinate the installation of heavy and large equipment with the Construction Manager or General Contractor. If the Mechanical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.

C Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.8 WARRANTY

A Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship from date of substantial completion.

B Provide 24 month warranty, unless otherwise noted, to the owner for all pumps, boilers, controllers, chillers, condensing units to ensure units have gone through entire cycle of seasons.

C The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

D Warranty requirements shall extend to correction, without cost to the Owner, of all Work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from defects or nonconformance with contract documents.

1.9 INSURANCE

A Contractor shall maintain insurance coverage of a minimum of 5 Million.

1.10 MATERIAL SUBSTITUTION

A Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.

B Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.

C Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.

D This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.

E This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.

F All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

PART 2 PRODUCTS

2.1 NOT APPLICABLE

PART 3 EXECUTION

3.1 JOBSITE SAFETY

A Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or his or her employee and subconsultants at a construction site, shall relieve the Contractor and other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in

connection with their work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 ARCHITECT/ENGINEER OBSERVATION OF WORK

A The Contractor shall provide seven (7) calendar days' notice to the Architect/Engineer prior to:
1. Placing fill over underground and underslab utilities.
2. Covering exterior walls, interior partitions and chases.
3. Installing hard or suspended ceilings and soffits.

B The Architect/Engineer will have the opportunity to review the installation and provide a written report noting deficiencies requiring correction. The Contractor's schedule shall account for these reviews and show them as line items in the approved schedule.

C Above-Ceiling Final Observation
1. All work above the ceilings must be complete prior to the Architect/Engineer's review. This includes, but is not limited to:
   a. Pipe insulation is installed and fully sealed.
   b. Pipe and duct wall penetrations are sealed.
   c. Pipe identification and valve tags are installed.
   d. Main, branch and flexible ducts are installed.
   e. Diffusers, registers and grilles are installed and connected to ductwork.
   f. Terminal air box reheat coil piping or wiring is complete.
   g. Terminal air box control wiring is complete and all control boxes are closed.
2. In order to prevent the Above-Ceiling Final Observation from occurring too early, the Contractor shall review the status of the work and certify, in writing, that the work is ready for the Above-Ceiling Final Observation.
3. It is understood that if the Architect/Engineer finds the ceilings have been installed prior to this review and prior to 7 days elapsing, the Architect/Engineer may not recommend further payments to the contractor until such time as full access has been provided.

3.3 PROJECT CLOSEOUT

A The following paragraphs supplement the requirements of Division 1.

B Final Jobsite Observation:
1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
3. Upon Contractor certification that the project is complete and ready for a final observation, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
4. It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineer's additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.

C Before final payment is authorized, this Contractor must submit the following:
1. Operation and maintenance manuals with copies of approved shop drawings.

2. Record documents including marked-up or reproducible drawings and specifications.
3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
4. Inspection by State Boiler Inspector.
5. Start-up reports on all equipment requiring a factory installation inspection or start- up.
6. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.4 OPERATION AND MAINTENANCE MANUALS

A General:

1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer’s review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer’s comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
2. Approved O&M manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.

B Electronic Submittal Procedures:

1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
    a. O&M file name: O&M.div23.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be divided into files that are clearly labeled as “1 of 2”, “2 of 2”, etc.
6. Provide the Owner with an approved copy of the O&M manual in digital format which is tabbed and bookmarked accordingly.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C Operation and Maintenance Instructions shall include:

1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.

3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test and balance reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.
14. List of lubricants in all equipment and recommended frequency of lubrication.
15. Instruction books, cards, and manuals furnished with the equipment.

3.5 INSTRUCTING THE OWNER'S REPRESENTATIVES

A Adequately instruct the Owner's designated representatives in the maintenance, care, and operation of all systems installed under this contract.

B Provide verbal and written instructions to the Owner's representatives by FACTORY PERSONNEL in the care, maintenance, and operation of the equipment and systems.

C Contractor shall make a DVD video recording of instructions to the Owner while explaining the system so additional personnel may view the instructions at a later date. The video recording shall be the property of the Owner.

D The instructions shall include:
1. Explanation of all system flow diagrams.
2. Explanation of all air handling systems.
3. Temperature control system operation including calibration, adjustment and proper operating conditions of all sensors.
4. Maintenance of equipment.
5. Start-up procedures for all major equipment.
6. Explanation of seasonal system changes.

E The Architect/Engineer shall be notified of the time and place instructions will be given to the Owner's representatives so he or his representative can attend if desired.

F Minimum hours of instruction for each item shall be:
1. Heating Water System - 8 hours.
2. Chilled Water System - 8 hours.
3. Chemical Treatment System - As defined in Section 23 25 00.
4. Combustion Air System - 4 hours.
5. Air Handling System(s) - 8 hours.
6. Computer Room System(s) - 2 hours.
7. Exhaust System(s) -4 hours.
8. Temperature Controls - As defined in Section 23 09 00.

G The Contractor shall prepare a detailed, written training agenda and submit it to the Architect/Engineer a minimum of four weeks prior to the formal training for approval. The written

agenda shall include specific training points within the items described above. For example: how to adjust setpoints, troubleshooting, proper start-up, proper shut-down, seasonal changes, draining, venting, changing filters, changing belts, etc. Failure to provide and follow an approved training agenda may result in additional training required at the expense of the Contractor.

H Operating Instructions:
1. Contractor is responsible for all instructions to the Owner's representatives for the mechanical and control systems.
2. If the Contractor does not have staff that can adequately provide the required instructions he shall include in his bid an adequate amount to reimburse the Owner for the Architect/Engineer to perform these services.

3.6 RECORD DOCUMENTS

A The following paragraph supplements Division 1 requirements:
1. Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.

B Mark drawings to indicate revisions to piping and ductwork, size and location, both exterior and interior; including locations of coils, dampers, other control devices, filters, and other
1. units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned from column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (e.g., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.

C Refer to Section 23 09 00 for additional requirements for Temperature Control documents.

D Before completion of the project, a set of reproducible mechanical drawings will be given to the Contractor for transfer of all as-built conditions from the paper set maintained at the job site. All marks on reproducibles shall be clear and permanent.

E Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.

F Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.

G Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

3.7 PAINTING

A This Contractor shall paint the following items:
1. All exposed ductwork. Color selected by architect.

B Paint all equipment that is marred or damaged prior to the Owner's acceptance. Paint and color shall match original equipment paint and shall be obtained from the equipment supplier if available.

C Equipment in finished areas that will be painted to match the room decor will be painted by others. Should this Contractor install equipment in a finished area after the area has been painted, he shall have the equipment and all its supports, hangers, etc., painted to match the room decor.

D Equipment cabinets, casings, covers, metal jackets, etc., in equipment rooms or concealed spaces, shall be furnished in standard or prime finish, free from scratches, abrasions, chips,

etc.

E Equipment in occupied spaces, or if standard to the unit, shall have a baked primer with baked enamel finish coat free from scratches, abrasions, chips, etc. If color option is specified or is standard to the unit, this Contractor shall, before ordering, verify with the Architect/Engineer his color preference and furnish this color.

F Paint all equipment in unfinished areas such as boiler room, mechanical spaces, storage room, etc., furnished by this Contractor. Equipment furnished with a factory coat of paint and enamel need not be painted, provided the factory applied finish is not marred or spattered. If so, equipment shall be refinished with the same paint as was factory applied.

G Paint all outdoor uninsulated steel piping the color selected by Owner or Architect/Engineer.

H After surfaces have been thoroughly cleaned and are free of oil, dirt, and other foreign matter; paint all pipes and equipment with the following:

1. Bare Metal Surfaces - Apply one coat of primer suitable for the metal being painted. Finish with two coats of Alkyd base enamel paint.
2. Insulated Surfaces - Paint insulation jackets with two coats of semi-gloss acrylic latex paint.
3. Color of paint shall be as selected by Architect.

3.8 ADJUST AND CLEAN

A Thoroughly clean all equipment and systems prior to the Owner's final acceptance of the project. Clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from all equipment.

B Clean all drain pans and areas where moisture is present. Immediately report any mold, biological growth, or water damage.

C Remove all rubbish, debris, etc., accumulated during construction from the premises.

3.9 SPECIAL REQUIREMENTS

A Contractor shall coordinate the installation of all equipment, valves, dampers, operators, etc., with other trades to maintain clear access area for servicing.

B All equipment shall be installed in such a way to maximize access to parts needing service or maintenance. Review the final field location, placement, and orientation of equipment with the Owner’s designated representative prior to setting equipment.

C Installation of equipment or devices without regard to coordination of access requirements and confirmation with the Owner’s designated representative will result in removal and reinstallation of the equipment at the Contractor’s expense.

END OF SECTION 230500

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

A Testing, adjustment, and balancing of air systems.

1.2 RELATED REQUIREMENTS

A Section 012100 - Allowances: Inspection and testing allowances.

1.3 PRICE AND PAYMENT PROCEDURES

A Cash Allowance: See Section 012100 for additional requirements.

B Allowance includes testing, adjusting, and balancing of mechanical systems.

1.4 REFERENCE STANDARDS

A ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).

1.5 SUBMITTALS

A See Section 013000 - Administrative Requirements, for submittal procedures.

B 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. 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. Procedures for formal deficiency reports, including scope, frequency and distribution.

C 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 Engineer 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

3.1 GENERAL REQUIREMENTS

A Perform total system balance in accordance with one of the following:

B Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C 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:

D TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

E Pre-Qualified TAB Agencies:
1. Design Control.
2. Balancing Professionals.
3. MNDak Testing and Balancing

3.2 EXAMINATION

A Verify that systems are complete and operable before commencing work. Installing Contractor shall 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.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

3.3 PREPARATION

A Hold a pre-balancing meeting at least one week prior to starting TAB work.

B Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

3.4 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.

C Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 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.
3. Contract interpretation requests.
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 After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

E Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 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 Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

F Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

G 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.

H Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

I Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

J Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

K For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.7 SCOPE

A Test, adjust, and balance the following:

1. Packaged Roof Top Heating/Cooling Units.
2. Fans.
3. Air Inlets and Outlets.

3.8 MINIMUM DATA TO BE REPORTED

A Air Moving Equipment:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Arrangement/Class/Discharge.
6. Air flow, specified and actual.
7. Return air flow, specified and actual.
8. Outside air flow, specified and actual.
9. Total static pressure (total external), specified and actual.
10. Inlet pressure.

11. Discharge pressure.
12. Sheave Make/Size/Bore.
13. Number of Belts/Make/Size.
14. Fan RPM.

B Exhaust Fans:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Sheave Make/Size/Bore.
10. Number of Belts/Make/Size.

C Duct Traverses:

1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Duct insulation.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- C ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- D ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- E ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
- F SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- G UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 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.

1.5 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.

1.6 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.
- C All insulation shall be replaced if subjected to water or moisture during installation. Contractor is not allowed to dry insulation in place.

1.7 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

2.1 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.

2.2 GLASS FIBER, FLEXIBLE
- A Manufacturer:
  1. CertainTeed Corporation: www.certainteed.com/#sle.

2. Johns Manville: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation: www.ocbuildingspec.com/#sle.

B Insulation: ASTM C553; flexible, noncombustible blanket.
1. K value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent by weight.

C Vapor Barrier Jacket:
1. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
2. 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 Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter.

2.3 GLASS FIBER, RIGID

A Manufacturer:
1. CertainTeed Corporation: www.certainteed.com/#sle.
2. Johns Manville: www.jm.com/#sle.
3. Knauf Insulation: www.knaufinsulation.com/#sle.
4. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.

B Insulation: ASTM C612; rigid, noncombustible blanket.
1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Maximum Density: 8.0 pcf.

PART 3 EXECUTION

3.1 EXAMINATION

A Test ductwork for design pressure prior to applying insulation materials.

B Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Install in accordance with NAIMA National Insulation Standards.

C 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.

D 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.

E 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.

F Duct Liner Application:

1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES (ALL R VALUES ARE INSTALLED VALUES)

A All Supply and Return Ducts: R-6 Flexible

END OF SECTION 230713

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HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Metal ducts.

1.2 RELATED REQUIREMENTS
- A Section 230130.51 - HVAC Air-Distribution System Cleaning: Post install duct cleaning.
- B Section 230713 - Duct Insulation: External insulation and duct liner.
- C Section 233300 - Air Duct Accessories.
- D Section 233600 - Air Terminal Units.
- E Section 233700 - Air Outlets and Inlets: Fabric air distribution devices.

1.3 REFERENCE STANDARDS
- A ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- E NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- F SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.4 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.
- C Manufacturer's Certificate: Certify that installation of glass fiber ductwork meets or exceed specified requirements.
- D Manufacturer's Installation Instructions: Indicate special procedures for glass fiber ducts.

1.5 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 three years of documented experience.

1.6 FIELD CONDITIONS
- A Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS
- A Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B Duct Shape and Material in accordance with Allowed Static Pressure Range:
  1. Round: Plus or minus 2 in-wc of galvanized steel.
  2. Rectangular: Plus or minus 2 in-wc of galvanized steel.
  3. Flat Oval: Plus 2 in-wc of galvanized steel.
- C Duct Sealing and Leakage in accordance with Static Pressure Class:
  1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
     a. Supply Air: 1 in-wc pressure class, galvanized steel.
     b. Outside Air Intake: 1 in-wc pressure class, galvanized steel.

c. Return and Relief Air: 1 in-wc pressure class, galvanized steel.
d. General Exhaust Air: 1 in-wc pressure class, galvanized steel.

2. Low Pressure Service: Up to 2 in-wc:
   a. Seal: Class C, apply to seal off transverse joints.
   b. Leakage:
      1) Rectangular: Class 24 or 24 cfm/100 sq ft.
      2) Round: Class 12 or 12 cfm/100 sq ft.

D Duct Fabrication Requirements:

1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
3. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 METAL DUCTS

A Material Requirements:

1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B Flat-Oval Metal Ducts:

1. Flat-Oval Single Wall Duct: Machine made from a round spiral lock seam duct.
   a. Fittings: Manufacture at least two gauges heavier metal than the duct.
   b. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.

C Round Metal Ducts:

1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).
   a. Manufacturers:
      1) Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.

D Round Spiral Duct:

1. Round spiral lock seam duct with galvanized steel outer wall.

E Connectors, Fittings, Sealants, and Miscellaneous:

1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and

corner clips in accordance with SMACNA (DCS).

3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
   a. 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.
   b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
4. Gasket Tape:
   a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
5. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

PART 3 EXECUTION

3.1 INSTALLATION

A Install, support, and seal ducts in accordance with SMACNA (DCS).

B Install products following the manufacturer's instructions.

C Comply with safety standards NFPA 90A and NFPA 90B.

D During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.

E Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

F Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.

G Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

H Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with a crimp in the direction of airflow.

I Connect terminal units to supply ducts directly or with 3 feet maximum length of flexible duct. Do not use flexible duct to change direction.

J Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp. Do not use flexible duct to change direction.

K Set plenum doors at 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.

L Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 233300, 233600, and 233700.

M Duct Insulation: Provide duct insulation. See Section 230713.

3.2 CLEANING

A Clean thoroughly each duct system if it becomes dirty during construction. See Section 230130.51.

B Clean duct system by forcing air at high velocity through duct to remove accumulated dust. Clean half the system at a time to obtain sufficient air. Protect equipment that could be harmed by excessive dirt with temporary filters or bypass during cleaning.

C Clean duct systems with high-power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters or bypass during cleaning. Provide adequate access to the ductwork for cleaning purposes.

END OF SECTION 233100

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Air turning devices/extractors.
- B Duct access doors.
- C Duct test holes.
- D Volume control dampers.

1.2 RELATED REQUIREMENTS
- A Section 233100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS
- A NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- B SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.4 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- C Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
- D Project Record Drawings: Record actual locations of access doors and test holes.

1.5 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.

1.6 DELIVERY, STORAGE, AND HANDLING
- A Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS
- A Manufacturers:
  1. Krueger-HVAC, Division of Air System Components: www.krueger-hvac.com/#sle.
  2. Ruskin Company: www.ruskin.com/#sle.
  3. Titus HVAC, a brand of Johnson Controls: www.titus-hvac.com/#sle.
  4. Greenheck
- B Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 DUCT ACCESS DOORS
- A Manufacturers:
  1. Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
  2. Nailor Industries, Inc: www.nailor.com/#sle.
  3. Ruskin Company: www.ruskin.com/#sle.
- B Fabricate in accordance with SMACNA (DCS) and as indicated.
- C Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick-fastening locking devices. For insulated ducts, install minimum 1-inch thick insulation with sheet metal cover.
  1. Less Than 12 inches Square: Secure with sash locks.
  2. Up to 18 inches Square: Provide two hinges and two sash locks.

3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.

D Access doors with sheet metal screw fasteners are not acceptable.

2.3 DUCT TEST HOLES

A Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.4 VOLUME CONTROL DAMPERS

A Manufacturers:

B Fabricate in accordance with SMACNA (DCS) and as indicated.

C Splitter Dampers:

1. Material: Same gauge as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

D Single Blade Dampers:

1. Fabricate for duct sizes up to 6 by 30 inch.
2. Blade: 24 gauge, 0.0239 inch, minimum.

E End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

PART 3 EXECUTION

3.1 PREPARATION

A Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.

B Provide duct test holes where indicated and required for testing and balancing purposes.

C Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.

D Use splitter dampers only where indicated.

E 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

AXIAL HVAC FANS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Ceiling fans.

1.2 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Test Reports: Indicate performance data for adjustable axial fan blades for at least five-blade settings, including maximum.
- C Manufacturer's Instructions: Indicate installation instructions.

1.3 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.

1.4 DELIVERY, STORAGE, AND HANDLING
- A Protect motors, shafts, and bearings from weather and construction dust.

1.5 FIELD CONDITIONS
- A Do not use permanent fans for ventilation during construction.

PART 2 PRODUCTS

2.1 CEILING FANS
- A Manufacturers:
- B Construction: Aluminum blades, statically and dynamically balanced, locked to shaft, directly connected to direct-drive, reversible motor.
- C Number of Fan Blades: Three.
- D Mounting Options: Ceiling.
- E Accessories:
  1. Provide and Install speed controller
  2. Provice 36" downrod.
  3. Provide secondary cable support

PART 3 EXECUTION

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

END OF SECTION 233413

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HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Roof exhausters.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B AMCA 99 - Standards Handbook; 2016.
- C AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.
- D AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- E AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- F AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS
- A Coordination: Coordinate fan roof curbs and service utilities installation according to fan size.
- B Sequencing: Ensure that utility connections are completed in an orderly and expeditious manner.

1.5 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C Manufacturer's Instructions: Indicate installation instructions.
- D Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 QUALITY ASSURANCE
- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS - APPROVED FOR ALL CATAGORIES
- A Carnes, a division of Carnes Company Inc: www.carnes.com/#sle.
- B Greenheck Fan Corporation: www.greenheck.com/#sle.
- C Loren Cook Company: www.lorencook.com/#sle.
- D Twin City Fan & Blower: www.tcf.com/#sle.

2.2 POWER VENTILATORS - GENERAL
- A Static and Dynamically Balanced: Comply with AMCA 204.
- B Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
- D Fabrication: Comply with AMCA 99.
- E Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.3 ROOF EXHAUSTERS
- A Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb

with continuous curb gaskets.

B Roof Curb: 24 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips.

C Disconnect Switch: Factory wired, nonfusible, in housing for thermal overload protected motor and wall mounted multiple speed switch.

D Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.

E Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm gets attained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

F Performance Ratings: As indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Secure roof exhausters with cadmium plated steel lag screws to roof curb.

C Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

D Install backdraft dampers on inlet to roof and wall exhausters.

3.2 SCHEDULES - SEE DRAWING SCHEDULES

END OF SECTION 233423

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Diffusers:
- B Rectangular ceiling diffusers.
- C Registers/grilles:
  1. Ceiling-mounted, exhaust and return register/grilles.
  2. Ceiling-mounted, supply register/grilles.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012, with Editorial Revision (2015).
- B ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.

1.4 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.

1.5 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 Provide room schedule and coordinate with general items located in the ceiling and floor. Ceiling items include but are not limited to lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and moldings.
- D Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS
- A Metalaire, a brand of Metal Industries Inc: www.metalaire.com/#sle.
- B Price Industries: www.price-hvac.com/#sle.
- C Ruskin Company: www.ruskin.com/#sle.
- D Titus, a brand of Air Distribution Technologies: www.titus-hvac.com/#sle.
- E Tuttle and Bailey: www.tuttleandbailey.com/#sle.
- F Nailor.

2.2 RECTANGULAR CEILING DIFFUSERS
- A Type: Provide rectangular and square formed adjustable, backpan stamped, core removable, and Plaque ceiling diffusers constructed to maintain 360 degree discharge air pattern.
- B Connections: Round.
- C Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.
- D Fabrication: Steel with baked enamel finish.
- E Color: As indicated.
- F Accessories: Provide radial opposed blade and butterfly volume control damper; plaster ring and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

2.3 CEILING SUPPLY REGISTERS/GRILLES

A Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.

B Frame: 1-1/4 inch 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.

F Solid Ceiling Accessory: Provide plaster ring for all diffusers in solid surface ceiling with gaskets.

2.4 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.

B Frame: 1-1/4 inch margin with countersunk screw mounting.

C Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.

D Color: As indicated.

E Solid Ceiling Accessory: Provide plaster ring for all diffusers in solid surface ceiling with gaskets.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

C Install diffusers to ductwork with air tight connection.

D Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

3.2 CLOSEOUT ACTIVITIES

A Demonstrate operational system to Owner's representative.

B Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

3.3 PROTECTION

A Protect installed products until completion of project.

B Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION 233700

CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES
- A Electric cabinet unit heaters.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS
- A AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addenda (2011).
- B UL 674 - Electrical Motors and Generators for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS
- A Preinstallation Meeting: Conduct a preinstallation meeting prior to the start of the work of this section; require attendance by all affected installers.

1.5 SUBMITTALS
- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide typical catalog of information including arrangements.
- C Shop Drawings:
  1. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
- D Certificates: Certify that coils are tested and rated in accordance with AHRI 410.
- E Manufacturer's Instructions: Indicate installation instructions and recommendations.
- F Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access or valving.
- G Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.
- H Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE
- A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.7 WARRANTY
- A See Section 017800 - Closeout Submittals for additional warranty requirements.
- B Provide 5 year manufacturer's warranty for _____.

PART 2 PRODUCTS

2.1 ELECTRIC CABINET UNIT HEATERS
- A Manufacturers:
  1. INDEECO (Industrial Engineering and Equipment Company): www.indeeco.com/#sle.
  2. Marley Engineered Products: www.marleymep.com/#sle.
  3. Qmark
- B Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to authority having jurisdiction as suitable for purpose indicated.
- C Heating Elements: Provide open-wire, finned tubular, or resistance wire enclosed in steel sheath.

D Cabinet:
1. Minimum 18 gauge, 0.0478 inch thick steel front panel with exposed corners and edges rounded, easily removed panels, glass fiber insulation and integral air outlet, and inlet grilles.
2. Provide required hardware accessories for recessed, semi-recessed, or wall mounting.

E Finish:
1. Factory applied, painted finish.
2. Color: As indicated on drawings.

F Fan: Factory balanced, direct drive, axial type with fan guard connected to totally enclosed, thermally protected motor with permanently lubricated bearings, and thermal cutout switch with automatic reset to de-energize electric heating elements in the event of overheating.

G Controls:
1. Built-in line-voltage thermostat.

H Filter: Easily removed, 1 inch thick glass fiber throw-away type, located to filter air before coil.

I Electrical Characteristics: See Drawings Schedule

PART 3 EXECUTION

3.1 EXAMINATION

A Verify that surfaces are suitable for installation.

B Verify that field measurements are as indicated on drawings.

3.2 PREPARATION

3.3 INSTALLATION

A Install in accordance with manufacturer's recommendations.

B Install equipment exposed to finished areas after walls and ceilings are finished and painted.

C Do not damage equipment or finishes.

D Baseboard Radiation:
1. Locate on outside walls and run cover continuously wall-to-wall unless otherwise indicated.
2. Center elements under window with elements of equal length centered under each window for multiple windows.
3. Install end caps where units butt against walls.

E Finned Tube Radiation:
1. Locate on outside walls and run cover continuously wall-to-wall unless otherwise indicated.
2. Center elements under window with elements of equal length centered under each window for multiple windows.
3. Align cabinet joints with window mullions.
4. Install wall angles where units butt against walls and align cabinet joints with window mullions.

3.4 FIELD QUALITY CONTROL

A See Section 014000 - Quality Requirements for additional requirements.

3.5 CLEANING

A After construction and painting is completed, clean exposed surfaces of units.

B Vacuum clean coils and inside of units.

C Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.

D Provide and Install new filters.

3.6 PROTECTION

A Provide finished cabinet units with protective covers during the balance of construction.

3.7 EQUIPMENT SCHEDULES: SEE DRAWINGS

END OF SECTION 238200

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PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and comprehend all Sections within Division 00 & 01 and that this Specification Section.

B. Description:

1. Basic electrical requirements.

C. Work Included:

1. Coordination and installation.
2. Complete electrical power system including light fixtures, equipment, motors, outlets, etc.
3. Complete low voltage dimming system.
4. Complete theatrical lighting system.
5. Removal work and/or relocation and reuse of existing systems and equipment.

D. Work Not Included:

1. Wiring of equipment.
2. Telephone wiring will be by others in raceways and conduits provided as part of the Electrical work.
3. Temperature control wiring for plumbing, heating, and air-conditioning equipment (unless otherwise indicated) will be by other Contractors.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Abbreviations and Acronyms listed

1. NECA National Electrical Contractors Association

C. Definitions:

1. See Section 01 4200 – References, for universal definitions related to the Work.
2. “Mechanical Contractor" as referred to herein refers to the Contractors as follows:

   a. Plumbing Contractor.
   b. HVAC Contractor.
   c. Fire Protection Contractor.

3. Motor Power Wiring. The single phase or 3 phase wiring extending from the power source (transformer, panelboard, feeder circuits, etc.) through disconnect switches and motor controllers to, and including the connections to the terminals of the motor.
4. Motor Control Circuit Wiring. The wiring associated with the remote operation of the magnetic coil of magnetic motor starter or relay, or the wiring which permits the direct cycling of the motor by means of a device in series with the motor power wiring. In the latter case the devices are usually single phase, have “Manual-Off-Auto” provisions, and are usually (but not always) connected into the motor power wiring through a manual motor starter.
5. Control devices such as start-stop push buttons, thermostats, pressure switches, flow switches, other relays, etc. generally represent the type of equipment associated with motor control circuit wiring.

6. Motor control circuit wiring is single phase and usually will be 120 volts. In some instances, the voltage will be the same as the motor power wiring. Generally, where the motor power wiring exceeds 120 volts, a control transformer is provided to give a control voltage of 120 volts.
7. Temperature Control Wiring: The wiring associated with the operation of a motorized damper, solenoid valve or motorized valve, etc., either modulating or two (2) position, as opposed to wiring which directly powers or controls a motor used to drive equipment such as fans, pumps, etc.
8. Control Motor: Where the term "Control Motor" is used without other clarification, it means an electrical device used to operate dampers, valves, etc. It may be of such a design to produce two position or modulating operation of the operated device. Conventional characteristics of such a motor are 24 volts, 60 cycles, 1 phase, although other voltages at times may be encountered.

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria that the Work shall fulfill.

B. Work to Conform to:

1. This Specification and the accompanying drawings govern the work involved in furnishing, installing, testing and placing into satisfactory operation the Electrical Systems as shown on the drawings and specified herein.
2. Each Contractor shall provide and install new materials as indicated in the schedules on the Drawings and/or in these Specifications, and all items required to make their portion of the electrical system a finished and working system.
3. NECA 1 – Standard Practices for Good Workmanship in Electrical Construction.
4. Materials:

    a. See additional requirements which may be listed under Division 1 of this Specification.
    b. Where several manufacturer's names are given, the first named manufacturer constitutes the basis for job design and establishes the equipment quality required to be used in this contract.
    c. This Contractor, at his option, may use equivalent equipment as manufactured by the other named manufacturers. This Contractor is responsible to ensure that all items submitted by these other manufacturers meets all requirements of the drawings and specifications and fits in the allocated space. The final determination of a product being equivalent shall be determined by the Engineer when a catalog number is not listed or listed in part.
    d. Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten (10) days prior to the bid opening date.
    e. This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder. Should a voluntary alternate material be accepted, This Contractor shall assume all costs that may be incurred as a result of using the offered material, article, or equipment necessitating extra expense on his part or on the part of other Contractors whose work is affected.
    f. All material substitutions requested later than ten (10) days prior to bid opening may be listed as voluntary changes on the bid form and shall be treated as voluntary prices as described above.

C. Qualifications:

1. Only products of reputable manufacturers as determined by the Engineer will be acceptable.

2. Each Contractor and his subcontractors shall employ only workmen who are skilled in their respective trades. At all times, the number of apprentices at the job site shall be less than or equal to the number of journeymen at the job site.

D. Warranty

1. Provide one (1) year warranty for all fixtures, equipment, materials and workmanship.

   a. For Owner furnished equipment, Contractor shall be responsible for any labor associated with warranty issues and will work directly with the Supplier for warranty claims on the materials.
   b. Contractor shall also include one (1) additional year of support to provide labor as required to INVESTIGATE issues that might arise after the initial one-year warranty.

2. The warranty period for the entire installation described in this Division of the specifications shall commence on the date of final written acceptance unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system, or separate piece of equipment or component is place in operation and accepted in writing by the Owner or his representative.
3. Warranty requirements shall extend to correction, without cost to the final use, of all Work and/or equipment found to be defective or non-conforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from such defects or nonconformance with contract documents exclusive of repairs required as a result of improper maintenance or operation, or of normal wear as determined by the Architect/Engineer.

E. Compliance with Codes, Laws, Ordinances:

1. This Contractor shall conform to all requirements of local codes, laws, ordinances and other regulations having jurisdiction over this installation.
2. In the event there are no local codes having jurisdiction over this job, the current issue of the National Electrical Code shall be followed.
3. If there is a discrepancy between the codes and regulations having jurisdiction over the installation, and these specifications, the codes and regulations shall determine the method or equipment used.
4. If the Contractor notes, at the time of bidding, any parts of the drawings and specifications which are not in accord with the applicable codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time to follow this procedure, he shall submit with his proposal a separate price required to make the system shown on the drawings comply with the codes and regulations.
5. All changes to the system made after the letting of the contract, in order to comply with the applicable codes or the requirements of the Inspector, shall be made by the Contractor without cost to the Owner.

F. Permits, Fees, Taxes, Inspections:

1. Procure all applicable permits and licenses.
2. Abide by all applicable laws, regulations, ordinances, and other rules of the State or Political Subdivision wherein the work is done, or as required by any duly constituted public authority.
3. Pay all applicable charges for such permits or licenses that may be required.
4. Pay all applicable fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
5. Pay all charges arising out of required inspections by the codes, permits, licenses or otherwise may be required by an authorized body.
6. Pay any charges by the telephone company related to the service or change in service to the project.
7. All fixtures, equipment, and materials shall be as approved or listed by the following: (Unless approval or listing is not applicable to an item by all acceptable manufacturers.)

a. Factory Mutual
b. Underwriters' Laboratories, Inc.

G. Utility Company Requirements:

1. Secure from the appropriate utility company all applicable requirements that must be followed to make the job comply with their requirements.
2. Make the installation comply with the utility company requirements.

H. Examination of Drawings:

1. The drawings for the electrical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of electrical raceways so as to best fit the layout of the job.
3. Scaling of the drawings will not be sufficient or accurate for determining these locations.
4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
5. Because of the scale of the drawings, certain basic items, such as a junction boxes, pull boxes, conduit fittings, etc. may not be shown, but where such items are required by other sections of the specifications or where they are required for proper installation of the work, such items shall be furnished and installed.
6. If any item is either shown on the drawings or called for in the specifications, it shall be considered sufficient for including same in this contract.
7. The determination of quantities of material and equipment required shall be made by the Contractor from the drawings. Schedules on the drawings and in the specifications are completed as an aid to the Contractor but where discrepancies arise, the greater number shall govern.

I. Field Measurements:

1. Before ordering any conduit, conductors, wireways, bus duct, fittings, etc., this Contractor shall verify all pertinent dimensions at the job site and be responsible for their accuracy.
2. Field verify quantities of all light fixtures and compare / coordinate with fixture supplier.

J. Coordination and Pre-Installation Meeting

1. Per Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

a. Coordinate arrangement, mounting, and support of electrical equipment:

1) To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2) To provide for ease of disconnecting the equipment with minimum interference to other installations.
3) To allow right of way for piping and conduit installed at required slope.
4) So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

b. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

K. Division of Work between Mechanical, Electrical, and Control Contractors

1. The purpose of these Specifications is to outline the Electrical and Mechanical Contractor's work responsibilities as related to control wiring, starters, disconnects and other electrical work required for items such as temperature controls, mechanical equipment, fans, chillers, compressors, etc. The exact wiring requirements for much of the equipment cannot be determined until the systems have been purchased and submittals approved. Therefore, only known wiring, as related to such items, is shown on the electrical drawings as being by the Electrical Contractor. Other wiring not shown on the electrical drawings but required for the mechanical equipment and systems shall be the responsibility of the Mechanical Contractor.
2. Where the drawings require the Electrical Contractor to wire between various pieces of equipment furnished by the Mechanical Contractor, such wiring shall be terminated at terminals provided in the equipment. It is the Mechanical Contractor's responsibility to provide complete wiring diagrams and supervision to the Electrical Contractor and to designate the terminal numbers for the correct wiring of the equipment.
3. Mechanical Contractor's Responsibility:

    a. Assumes all responsibility for the internal wiring of all equipment provided by the Mechanical Contractor, for example:

        1) Sump Pumps
        2) Package Air Handling Units
        3) Humidifiers

    b. Assumes all responsibility for miscellaneous items provided by the Mechanical Contractor that require wiring but are not shown on the electrical drawings or specified in the Electrical Specification. If items such as relays, flow switches, or interlocks are required to make the mechanical system function correctly or are required by the manufacturer, they are the responsibility of the Mechanical Contractor.
    c. Assumes all responsibility for the Temperature Control wiring, if the Temperature Control contractor is Subcontractor to the Mechanical Contractor.

4. Temperature Control Subcontractor's Responsibility:

    a. Assumes all responsibility for the complete wiring of any devices necessary to make the Temperature Control System functional.
    b. Assumes the responsibility for verifying any control wiring shown on the electrical drawings as being by the Electrical Contractor. If any wiring is required for the Control System, but not shown or scheduled on the electrical drawings, it shall be the responsibility of the Temperature Control Subcontractor.
    c. Assumes the responsibility of coordinating equipment locations (such as P.E.'s, E.P.'s, relays, transformer and etc.) with the Electrical Contractor where the wiring of the equipment is shown to be by the Electrical Contractor.

5. Electrical Contractor's Responsibility:

    a. Furnishes and installs all combination starters as shown on the Material's List of the Electrical Drawings or as indicated to be by the Electrical Contractor on the Mechanical Equipment Schedule of the Mechanical Drawings.
    b. Furnishes and installs all manual starters and disconnect devices as shown on the Material's List of the Electrical Drawings or as indicated to be by the Electrical Contractor on the Mechanical Equipment Schedule of the Mechanical Drawings.
    c. Installs and wires to all remote control devices furnished by the Mechanical Contractor or Temperature Control Subcontractor when such items are noted on the Electrical Drawings.
    d. Provides motor control wiring where so noted on the drawings.
    e. Provides temperature control wiring where so noted on the drawings.
    f. Electrical Contractor shall furnish, install, and connect all relays, etc., for automatic shutdown of certain mechanical equipment (i.e. supply fans, exhaust fans, etc.) upon actuation of the Fire Alarm System.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For high-pressure decorative laminate, cabinet hardware and accessories, and finishing materials and processes.
2. Shop Drawings:

a. Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.

b. Shop drawings shall establish the actual detail of all manufactured or fabricated items and shall indicate proper relation to adjoining work in sufficient detail to assure proper fit to the actual conditions. As used hereinbefore the term "manufactured" applies to standard units usually mass produced and "fabricated" applies to items specifically assembled or made out of selected materials to meet design requirements.

c. The Contractor shall obtain submittals successfully reviewed by the Architect/Engineer BEFORE releasing any equipment for manufacturing or shipment. The Architect/Engineer will stamp the index indicating review has been completed. No less than one copy of the submittals shall be retained by the Architect/Engineer regardless of their status. The following criteria shall be met:

1) Shop drawings shall be submitted electronically by the Contractor as directed by the Construction Manager via Submittal Exchange. The Contractor shall work directly with the supplier of Owner furnished equipment to obtain and submit shop drawings for such equipment.
2) Each submittal shall be assembled in sets containing similar type equipment. As applicable to this project, typical sets shall include: (This list is not to indicate the requirement to submit all listed items. See elsewhere in contract documents for required submittals.

a) All light fixtures including emergency and exit.
b) All panelboards, switchboards, switchgear, fuses, breakers, disconnect switches, motor control centers, manual motor starters, motor starters, termination bushings, transformers, pushbuttons and other switches (when part of motor control), pilot lights, and miscellaneous motor control and distribution equipment.
c) All variable frequency drives.
d) All generators, uninterruptible power supplies, and transfer switches.
e) All fire alarm components: smoke detectors, heat detectors, pull stations, audio devices, visual devices, annunciators, control panels, flashing devices, door hold-opens, auxiliary relays and other auxiliary devices.
f) All lightning protection components.
g) All intercommunication and miscellaneous systems components.
h) Other items as dictated elsewhere in the contract documents.

d. Each page shall be clearly marked with the same nomenclature used on the contract documents (specifications or drawings). The nomenclature shall be the same as the symbol designation or item number used on the material list when applicable. Each item shall clearly indicate the size, finish, material, voltage, etc. Shop drawings shall be custom produced and shall not be a reproduction, copy or tracing of the contract documents, either in full or in part.

e. Each bound set of shop drawings shall contain a double-spaced typed index of items enclosed to include the nomenclature as described above. Items required to have color or finish verified with the Architect/Owner shall have the status of the verification noted on the index.
f. The Contractor shall review and approve all shop drawings by signing and dating the index of each copy prior to the Architect/Engineer review. APPROVAL WILL INDICATE THE CONTRACTOR'S PREVIEW OF ALL MATERIAL AND A COMPLETE UNDERSTANDING OF EXACTLY WHAT IS TO BE FURNISHED. REVIEW WILL NOT BE INITIATED BY ARCHITECT/ENGINEER WITHOUT PRIOR APPROVAL NOTED BY CONTRACTOR'S STAMP.
g. Each page of the submittal, including the index, shall display the date of the current submittal. The index shall contain a clear white area no less than 3" X 4" available for the Architect's/Engineer's stamp. Items required for re-submittal will be noted on the index. Items noted for re-submittal shall not be considered successfully reviewed and shall not be released for manufacturing or shipment. Re-submittals shall be assembled as outlined above and shall contain only the items noted in the previous submittal.
h. Notations made on the shop drawings during the Architect's/Engineer's review does not relieve the Contractor from compliance with the requirements of the drawings and specifications. The Architect's/Engineer's review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions, providing all specified accessories, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.

3. Failure to comply with any of the above shall be reason for the Architect/Engineer to require re-submittal of the set. Shop drawings returned for re-submittal two (2) times shall have all additional Architect's/Engineer's times paid by the Contractor to complete proper review of the submittal.
4. Installation, maintenance and operation manuals and instructions for all equipment shall be provided as specified in the General Conditions and General Requirements section.
5. Submittals shall be required for each item listed on the contract documents' material list and any other material specifically requiring submittal by the specification and/or drawings.
6. Items submitted for review which were not requested by the Contract Documents shall be marked "Receipt Acknowledged" and returned to the Contractor. Submittal shall not be reviewed, but shall remain in Architect/Engineer's files for reference should questions relating to submittal occur during construction.

1.5 PRODUCT DELIVERY, STORAGE, HANDLING AND MAINTENANCE

A. Exercise care in transporting and handling to prevent damage to fixtures, equipment and materials.

B. Store materials on the site so as to prevent damage.

C. Keep fixtures, equipment and materials clean, dry and free from deleterious conditions.

D. Contractor shall coordinate delivery and receiving of all Owner furnished equipment with Supplier. Contractor shall be responsible for receiving all Owner furnished products at the job site and verifying there are no damages or shortages. Any discrepancies shall be reported directly to the Supplier.

PART 2 - PRODUCTS

2.1 GENERAL

A. All items of material having similar function (i.e. safety switches, panelboards, switchboards, contactors, motor starters, dry type transformers), shall be of the same manufacturer. This shall be adhered to unless specifically stated otherwise on drawings or elsewhere in specifications.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Coordinate mounting heights and locations of wall-mounted devices with Architectural millwork, displays, tackboards, etc.

D. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

E. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

F. Right of Way: Give to piping systems installed at a required slope.

3.2 FIELD QUALITY CONTROL

A. General:

1. The Contractor shall conduct all tests required and applicable to the work both during and after construction of the work.
2. The necessary instruments, meters, etc., required to conduct or make the tests shall be supplied by the Contractor who shall also supply a competent technician for making the tests who has been schooled in the proper testing techniques.
3. All cables and wires shall be tested for shorts and grounds following installation and connection to devices. Shorted or grounded wires and cables shall be removed and replaced.
4. Each circuit installed by Contractor over 100’ in length shall have the most distant outlet or load tested for voltage drop under full load conditions. Full load for outlet(s) shall be determined by multiplying the upstream overcurrent device by 80 percent and applying the calculated load to the most distant location of the circuit. Full load for equipment shall be equipment operation at full output. The Contractor shall increase wire size of circuit until voltage drop is below 3% of rated voltage. The Contractor shall provide a load bank to perform tests.
5. Any wiring device, electrical apparatus or lighting fixture furnished under this contract, if grounded or shorted on any integral “live” part, shall be removed and the trouble rectified by replacing all defective parts or materials as directed.
6. Cable insulation shall be tested for proper insulation values. Such tests shall include the cable, all splices, and all terminations. Each conductor shall be tested and shall test free from short circuits and grounds and have an insulation value not less than the National Electrical Code Standards. Readings shall be taken between conductors and between conductors and ground.

7. A record of readings taken shall be supplied to the Architect/Engineer in a neat and understandable form and in triplicate. The record shall include: circuit designation, ampere loading, voltage at circuit overcurrent device, and voltage at circuits extremity under full load as calculated in previous paragraph.
8. In the event the results obtained in the tests are not satisfactory, This Contractor shall make such adjustments, replacements and changes as are necessary and shall then repeat the test or tests which disclose faulty or defective work or equipment, and shall make such additional tests as the Architect/Engineer or code enforcing agency deems necessary.

B. Other Equipment:

1. Other equipment furnished and installed by the Contractor shall be given all standard tests normally made to assure that the equipment is electrically sound, all connections properly made, phase rotation correct, fuses and thermal elements suitable for protection against overloads, etc., voltage complies with equipment nameplate rating and full load amperes are within equipment rating.
2. In the event the results obtained in the tests are not satisfactory, the Contractor shall make such adjustments and changes as are necessary and shall then repeat the test or tests which disclose faulty or defective work or equipment, and shall make such additional tests as the Architect/Engineer or code enforcing agency deems necessary.

3.3 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.4 INSTRUCTING THE OWNER'S REPRESENTATIVE

A. Adequately instruct the Owner's designated representative or representatives in maintenance, care, and operation of the complete electrical systems installed under this contract. Adequate instructions shall include the following:

1. Three properly indexed and bound copies of record shop drawings including catalog and engineering data, as hereinafter defined, for all items of electrical equipment supplied.
2. Three (3) properly indexed and bound copies of written instructions for the care, maintenance, and operation of the electrical equipment and systems. Instruction books, cards, and manuals furnished with the equipment shall be included.
3. Provide verbal and written instructions to the Owner's representative or representatives by FACTORY PERSONNEL in the care, maintenance, and operation of the equipment and systems. The instructions shall be as long and often as necessary for the user agency to adequately understand the electrical system.

B. The Architect/Engineer shall be notified of the time and place for the verbal instructions to be given to the Owner's representative so that either he or his representative can be present if desirable.

C. Before the final payment will be authorized, This Contractor must have submitted the following for approval and disposition:

1. The bound copies of shop drawings.
2. The bound copies of written instructions for the care, maintenance, and operation of the electrical equipment.
3. A report stating the instructions given to the Owner's representative complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representative as having received the instructions.
4. The name, address, and telephone numbers of The Contractor and all Subcontractors shall be included as part of the bound copies of Shop Drawings.

3.5 SYSTEM COMMISSIONING

A. The electrical systems included in the construction documents are to be complete and operating systems. The Architect/Engineer will make periodic job site observations during the construction period. The system start-up, testing, balancing, and satisfactory system performance is the responsibility of the Contractor. This shall include all calibration and adjustments of electrical equipment controls, balancing of loads, and final adjustments that may be required.

B. All operating conditions and control sequences shall be simulated and tested during the start-up period. Testing shall also include all interlocks, safety shut-downs, system operations, and alarms.

C. The Contractor, subcontractors, and equipment suppliers are expected to have skilled technicians to ensure that the system performs as designed. If the Architect/Engineer is requested to visit the job site for the purpose of trouble shooting, assisting in the satisfactory start-up, obtaining satisfactory equipment operation, resolving installation and/or workmanship problems, equipment substitution issues or unsatisfactory system performance, including call backs during the warranty period through no fault of the design; the Contractor shall reimburse the Architect/Engineer on a time and material basis for services rendered at the Architect/Engineer's standard hourly rates in effect at the time the services are requested. The Contractor shall be responsible for making payment to the Architect/Engineer for services required that are product, installation or workmanship related. Payment is due within 30 days after services are rendered.

3.6 RECORD DRAWINGS

A. This Electrical Contractor shall maintain at the job site a separate and complete set of electrical drawings upon which he shall clearly and permanently mark and note in complete detail any changes made to the location and arrangement of the electrical apparatus or made in the electrical system and wiring as a result of building construction conditions or as a result of instructions from the Architect/Engineer.

B. Such record of changes shall be made daily by This Contractor and the marked drawings shall be available for the Architect and Engineer's examination at any normal work time.

C. Upon completion of the job, and before final payment is made, This Contractor shall give the marked-up drawings to the Architect/Engineer.

3.7 PAINTING

A. This Contractor shall paint any equipment which is marred or damaged prior to the Owner's acceptance and occupancy. Paint and color shall match original equipment paint and shall be obtained from the equipment supplier when available.

B. Equipment located in finished areas and which will be painted to match the room decor will be painted by others. Should This Contractor install equipment in a finished area after the area has been painted by others, he shall be responsible for having the equipment and all of the supports, hangers, etc., painted to match the room decor at the Contractor's expense. Painting shall be performed as described in project specifications.

C. Equipment cabinets, casings, covers, metal jackets, etc., located in equipment rooms or concealed spaces, shall be furnished in standard or prime finish free from scratches, abrasions, chippings, etc.

D. Equipment located in occupied spaces, or if standard to the unit, shall have a baked primer with baked enamel finish coat free from scratches, abrasions, chippings, etc. If color option is specified or color option given as standard to the unit, This Contractor shall, before ordering verify with the Architect/Engineer his color preference and shall furnish this color.

E. This Contractor shall paint equipment located in unfinished areas such as boiler room, mechanical spaces, storage room, etc., furnished by him. If certain equipment is furnished with a factory coat of paint and enamel, it need not be painted, providing the factory applied finished is in no way marred or spattered. If so, the item or piece of equipment shall be refinished with the same paint or enamel that was factory applied.

F. Electric conduits shall NOT be painted in crawl spaces, tunnels or spaces above suspended ceiling except that where conduit is in a damp location exposed threads at joints shall be given two coats of sealer after joint is made up.

G. After surfaces have been thoroughly cleaned and are free of oil, dirt or other foreign matter, the raceway or equipment shall be painted with the following paint materials:

1. Bare Metal Surfaces – Apply one coat of metal primer suitable for use on metal being painted. Finish with two coats of Alkyd base enamel paint.
2. Plastic Surfaces – Paint plastic surfaces with two coats of semi-gloss acrylic latex paint.

3.8 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer's written instructions.

1. Clean all equipment and systems prior to the Owner's final acceptance of the project.
2. Clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from equipment and fixtures.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and comprehend all Sections within Division 00 & 01 and that this Specification Section.

B. Work Included:

1. Coordination and installation.
2. Electrical demolition and extension.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

B. Verify field measurements and circuiting arrangements are as shown on Drawings.

C. Verify that abandoned wiring and equipment serve only abandoned facilities.

D. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Coordinate utility service outages with Utility Company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 24 hours before partially or completely disabling system. Minimize outage duration.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 24 hours before partially or completely disabling system. Minimize outage duration.

F. Existing Communication Systems: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Notify Owner and Telephone Utility Company at least 24 hours before partially or completely disabling system. Minimize outage duration.

3.3 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 which 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 which 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.

3.4 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer's written instructions.

1. Clean and repair existing materials and equipment which remain or are to be reused.
2. 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.
3. 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 and broken electrical parts.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and comprehend all Sections within Division 00 & 01 and that this Specification Section.

B. Work Included:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

C. Related Sections include the following:

1. Section 27 1500 - Communications Horizontal Cabling, for cabling used for voice and data circuits.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions:

1. See Section 01 4200 – References, for universal definitions related to the Work.
2. EPDM: Ethylene-propylene-diene terpolymer rubber.

C. Abbreviations and Acronyms listed

1. NEMA National Electrical Manufacturers Association
2. NETA InterNational Electrical Testing Association
3. NFPA National Fire Protection Association

D. ASTM standards listed

1. ASTM A 53/A 53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria that the Work shall fulfill.

B. Work to Conform to:

1. 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.
2. Comply with NFPA 70.
3. Trade Practice Sections listed:

a. NEMA WC 70 – Power Cables Rated 2,000V or Less for the Distribution of Electrical Energy
b. NFPA 70 – National Electrical Code
c. UL 486A-486B – Wire Connectors

C. Coordination and Pre-Installation Meeting

1. Per Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

a. Coordinate sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

D. Warranty: Manufacturer's standard warranty.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For each type of product indicated.
2. Field quality-control test reports.
3. Warranty.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.
6. Engineer Approved Equal.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and SO.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Engineer Approved Equal.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.4 SLEEVE SEALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.
5. Engineer Approved Equal.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.3 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. All wiring methods must be approved by local Authority Having Jurisdiction.

B. Service Entrance: Type THHN-THWN, single conductors in raceway.

C. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

F. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings: Type THHN-THWN, single conductors in raceway.

H. Branch Circuits Concealed in Walls, and Vertical Partitions: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC.

I. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

K. Class 1 Control Circuits: Type THHN-THWN, in raceway.

L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.4 INSTALLATION OF CONDUCTORS AND CABLES

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 26 0529 "Hangers and Supports for Electrical Systems."

G. Identify and color-code conductors and cables according to Section 26 0553 "Identification for Electrical Systems."

3.5 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both wall surfaces.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.7 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
    a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

3.10 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

SECTION 26 0526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and comprehend all Sections within Division 00 & 01 and that this Specification Section.

B. Description:

1. Grounding systems and equipment.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Abbreviations and Acronyms listed:

1. ASTM American Society for Testing and Materials
2. IEEE Institute of Electrical and Electronics Engineers
3. NETA InterNational Electrical Testing Association
4. NFPA National Fire Protection Association

C. Definitions:

1. See Section 01 4200 – References, for universal definitions related to the Work.

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria that the Work shall fulfill.

B. Work to Conform to:

1. Trade Practice Sections listed

a. IEEE C2 – National Electrical Safety Code
b. IEEE 81 – Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System
c. NETA MTS – Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems
d. NFPA 70 – National Electrical Code
e. NFPA 70B – Recommended Practice for Electrical Equipment Maintenance
f. NFPA 780 – Standard for the Installation of Lightning Protection Systems
g. UL 96 – Standard for Lightning Protection Components
h. UL 467 – Grounding and Bonding Equipment
i. 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.
j. Comply with UL 467 for grounding and bonding materials and equipment.

2. ASTM standards listed

a. ASTM B 3 – Standard Specification for Soft or Annealed Copper Wire
b. ASTM B 8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

C. Coordination and Pre-Installation Meeting

1. Per Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

D. Warranty: Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
5. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:

1. No. 4 AWG minimum, soft-drawn copper.
2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.

D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet in diameter.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 4/0 AWG minimum.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

C. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

D. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

E. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

D. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
5. Substations and Pad-Mounted Equipment: 5 ohms.
6. Manhole Grounds: 10 ohms.

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.6 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

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SECTION 26 0529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and understand all the requirements of Division 00 & 01 and this Section.

B. Work Included:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions/ Acronyms:

1. See Section 01 4200 – References, for universal definitions related to the Work.
2. EMT: Electrical metallic tubing.
3. IMC: Intermediate metal conduit.
4. RMC: Rigid metal conduit.
5. ASTM American Society for Testing and Materials
6. AWS American Welding Society
7. MFMA Metal Framing Manufacturers Association
8. MSS Manufacturers Standardization Society of the Valve and Fittings Industry
9. NECA National Electrical Contractors Association
10. NFPA National Fire Protection Association
11. SSPC The Society for Protective Coatings

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria of the Work.

B. Work to Conform to:

1. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. Comply with NFPA 70.
3. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
4. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.
5. ASTM standards listed

    a. ASTM A 36/A 36M – Standard Specification for Carbon Structural Steel
    b. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
    c. ASTM A 780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

6. Trade Practice Sections listed

a. AWS D1.1/D1.1M – Structural Welding Code-Steel
b. MFMA-4 – Metal Framing Standards Publication
c. MSS SP-58 – Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation
d. MSS SP-69 – Pipe Hangers and Supports - Selection and Application
e. NECA 1 – Standard Practices for Good Workmanship in Electrical Construction
f. NECA 101 – Standard for Installing Steel Conduit (Rigid, IMC, EMT)
g. NFPA 70 – National Electrical Code
h. SSPC-PA 1 – Shop, Field, and Maintenance Painting of Steel

C. Coordination and Pre-Installation Meeting

1. Per Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

a. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

D. Warranty: Manufacturer's standard warranty.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Shop Drawings: Show fabrication and installation details and include calculations for the following:

a. Trapeze hangers. Include Product Data for components.
b. Steel slotted channel systems. Include Product Data for components.
c. Equipment supports.

2. Welding certificates.
3. Warranty.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.
h. Engineer Approved Equal.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

5. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
        5) Engineer Approved Equal.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        5) MKT Fastening, LLC.
        6) Engineer Approved Equal.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

G. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.3 SUPPORT INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

C. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

D. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

E. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

F. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 Painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and comprehend all Sections within Division 00 & 01 and that this Specification Section.

B. Work Included:

1. Raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions:

1. See Section 01 4200 – References, for universal definitions related to the Work.
2. EMT: Electrical metallic tubing.
3. ENT: Electrical nonmetallic tubing.
4. EPDM: Ethylene-propylene-diene terpolymer rubber.
5. FMC: Flexible metal conduit.
6. IMC: Intermediate metal conduit.
7. LFMC: Liquidtight flexible metal conduit.
8. LFNC: Liquidtight flexible nonmetallic conduit.
9. NBR: Acrylonitrile-butadiene rubber.
10. RNC: Rigid nonmetallic conduit.

C. Abbreviations and Acronyms

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. NECA National Electrical Contractors Association
4. NEMA National Electrical Manufacturers Association
5. NFPA National Fire Protection Association
6. SCTE Society of Cable Telecommunication Engineers

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria that the Work shall fulfill.

B. Work to Conform to:

1. 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.
2. Comply with NFPA 70.
3. ANSI standards listed

a. ANSI C80.1 – Electrical Rigid Steel Conduit
b. ANSI C80.3 – Steel Electrical Metallic Tubing
c. ANSI C80.5 – Electrical Rigid Aluminum Conduit
d. ANSI C80.6 – Electrical Intermediate Metal Conduit

4. ASTM standards listed

    a. ASTM A 53/A 53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

5. Trade Practice Sections listed

    a. NECA 1 – Standard Practices for Good Workmanship in Electrical Construction
    b. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
    c. NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable
    d. NEMA OS 1 – Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
    e. NEMA OS 2 – Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports
    f. NEMA RN 1 – Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
    g. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Tubing and Conduit
    h. NEMA TC 3 – Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing
    i. NEMA TC 13 – Electrical Nonmetallic Tubing
    j. NFPA 70 – National Electrical Code
    k. SCTE 77 – Specification for Underground Enclosure Integrity
    l. UL 514B – Conduit, Tubing, and Cable Fittings
    m. UL 886 – Standard for Safety Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations
    n. UL 1660 – Liquid-Tight Flexible Nonmetallic Conduit
    o. UL 2024 – Standard for Cable Routing Assemblies and Communications Raceways

C. Coordination and Pre-Installation Meeting

1. Per Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

D. Warranty: Manufacturer’s standard warranty.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
2. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.

    a. Custom enclosures and cabinets.
    b. For handholes and boxes for underground wiring, including the following:

        1) Duct entry provisions, including locations and duct sizes.
        2) Frame and cover design.
        3) Grounding details.
        4) Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
        5) Joint details.

3. Warranty.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.
10. Engineer Approved Equal.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: ANSI C80.5.

D. IMC: ANSI C80.6.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

F. EMT: ANSI C80.3.

G. FMC: Aluminum.

H. LFMC: Flexible steel conduit with PVC jacket.

I. Fittings for Conduit (Including all Types and Flexible and Liquid tight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel or die-cast, set-screw type.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.
4. Engineer Approved Equal.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type.

E. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
14. Engineer Approved Equal.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.

E. Nonmetallic Floor Boxes: Nonadjustable, round.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

H. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Description: Comply with SCTE 77.

1. Color of Frame and Cover: Green.
2. Configuration: Units shall be designed for flush burial and have integral closed bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.

4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, as indicated for each service.
6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
7. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Armorcast Products Company.
b. Carson Industries LLC.
c. CDR Systems Corporation.
d. NewBasis.
e. Engineer Approved Equal.

2.5 SLEEVES FOR RACEWAYS

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

2.6 SLEEVE SEALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. Calpico, Inc.
3. Metraflex Co.
4. Pipeline Seal and Insulator, Inc.
5. Engineer Approved Equal.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: Plastic. Include two for each sealing element.
3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating or Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit or IMC.
2. Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.
3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
    a. Within Five Feet from Foundation Wall: Use rigid steel conduit.
    b. In or Under Slab on Grade: Use thickwall nonmetallic conduit and thinwall nonmetallic conduit.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
6. Application of Handholes and Boxes for Underground Wiring:
    a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
    b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Heavy-duty fiberglass units with polymer-concrete frame and cover, SCTE 77, Tier 8 structural load rating.
    c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit or IMC. Includes raceways in the following locations:
    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. In Slab Above Grade:
    a. Use thickwall nonmetallic conduit.
    b. Maximum Size Conduit in Slab: 3/4 inch.
6. Damp or Wet Locations: Rigid steel conduit or IMC.
7. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
8. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: Plenum-type, optical fiber/communications cable raceway.
9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

3.3 INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Complete raceway installation before starting conductor installation.

E. Support raceways as specified in Section 26 0529 "Hangers and Supports for Electrical Systems."

F. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

G. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

H. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

I. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

L. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
   c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
   d. Attics: 135 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed or semi-recessed lighting fixtures; equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.4 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

   a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete.

b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

5. Warning Tape: Bury warning tape approximately 12 inches above direct-buried conduits, placing it 24 inches o.c. Route tape along the centerline of conduit.

3.5 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.6 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

F. Cut sleeves to length for mounting flush with both surfaces of walls.

G. Extend sleeves installed in floors 2 inches above finished floor level.

H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.

I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."

L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.7 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.8 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.9 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

1. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
2. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
3. Repair damage to PVC or paint finishes with matching touch up coating recommended by manufacturer.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and comprehend all Sections within Division 00 & 01 and that this Specification Section.

B. Work Included:

1. Identification for raceway and metal-clad cable.
2. Identification for conductors and communication and control cable.
3. Warning labels and signs.
4. Instruction signs.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Abbreviations and Acronyms listed

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. CFR Code of Federal Regulations
4. IEEE Institute of Electrical and Electronics Engineers
5. NEMA National Electrical Manufacturers Association
6. NFPA National Fire Protection Association

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria of the Work.

B. Work to Conform to:

1. Comply with ANSI A13.1 and ANSI C2.
2. Comply with NFPA 70.
3. Comply with 29 CFR 1910.145.
4. ANSI standards listed
    a. ANSI A13.1 – Scheme for the Identification of Piping Systems
    b. ANSI C2 – National Electrical Safety Code
5. Specialty Code Sections listed
    a. 29 CFR 1910.145 – Specifications For Accident Prevention Signs And Tags
6. Trade Practice Sections listed
    a. NFPA 70 – National Electrical Code

C. Coordination and Pre-Installation Meeting

1. See requirements in Section 01 3100 – Project Management and Coordination.

2. Conduct pre-installation meeting one week before installation.

    a. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
    b. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
    c. Coordinate installation of identifying devices with location of access panels and doors.
    d. Install identifying devices before installing acoustical ceilings and similar concealment.

3. Warranty: Manufacturer’s standard warranty.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For each electrical identification product indicated.
2. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.
3. Warranty.

PART 2 - PRODUCTS

2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Color for Printed Legend:

1. Power Circuits: Black letters on an orange field.
2. Legend: Indicate system or service and voltage, if applicable.

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.

2.3 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.

C. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 10 by 14 inches.

D. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
3. Arc Flash Hazard Warning: “WARNING – ARC FLASH AND SHOCK HAZARD. APPROPRIATE PPE REQUIRED.”.

2.4 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16” thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.5 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

C. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb, minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding.

B. Paint: Paint materials and application requirements are specified in Division 09 Painting Sections.

C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 APPLICATION

A. Accessible Raceways and Metal-Clad Cables More Than 600 V: Identify with "DANGER-HIGH VOLTAGE" in black letters at least 2 inches high, with self-adhesive vinyl labels. Repeat legend at 10-foot maximum intervals.

B. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label or self-adhesive vinyl tape applied in bands.

C. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands:

1. Fire Alarm System: Red.
2. Fire-Suppression Supervisory and Control System: Red and yellow.
3. Combined Fire Alarm and Security System: Red and blue.
4. Security System: Blue and yellow.
5. Mechanical and Electrical Supervisory System: Green and blue.
6. Telecommunication System: Green and yellow.
7. Control Wiring: Green and red.

D. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

E. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use aluminum wraparound marker labels. Identify each ungrounded conductor according to source and circuit number.

F. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source and circuit number.

G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.

H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.
b. Controls with external control power connections.

2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

I. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer and/or load shedding.

J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

a. Panelboards, electrical cabinets, and enclosures.
b. Access doors and panels for concealed electrical items.
c. Electrical switchgear and switchboards.
d. Transformers.
e. Electrical substations.
f. Emergency system boxes and enclosures.
g. Motor-control centers.
h. Disconnect switches.
i. Enclosed circuit breakers.
j. Motor starters.
k. Push-button stations.
l. Power transfer equipment.
m. Contactors.
n. Remote-controlled switches, dimmer modules, and control devices.
o. Battery inverter units.
p. Battery racks.
q. Power-generating units.
r. Voice and data cable terminal equipment.
s. Master clock and program equipment.
t. Intercommunication and call system master and staff stations.
u. Television/audio components, racks, and controls.
v. Fire-alarm control panel and annunciators.
w. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.

x. Monitoring and control equipment.
y. Uninterruptible power supply equipment.
z. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.

3.3 INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Verify identity of each item before installing identification products.

C. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

D. Apply identification devices to surfaces that require finish after completing finish work.

E. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

F. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

G. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

H. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.

1. Color shall be factory applied or, for sizes larger than No. 10 AWG if authorities having jurisdiction permit, field applied.
2. Colors for 208/120-V Circuits:

   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.

3. Colors for 480/277-V Circuits:

   a. Phase A: Brown.
   b. Phase B: Orange.
   c. Phase C: Yellow.

4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

I. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

J. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

K. Painted Identification: Prepare surface and apply paint according to Division 09 Painting Sections.

3.4 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer's written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

END OF SECTION

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SECTION 26 0923
LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and understand all the requirements of Division 00 & 01 and this Section.

B. Work Included:

1. Time switches.
2. Indoor occupancy sensors.

C. Related Sections:

1. Section 26 2726 "Wiring Devices" for wall-box dimmers, wall-switch occupancy sensors, and manual light switches.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions:

1. LED: Light-emitting diode.
2. PIR: Passive infrared.

C. Abbreviations and Acronyms

1. IEEE Institute of Electrical and Electronics Engineers
2. NECA National Electrical Contractors Association
3. NEMA National Electrical Manufacturers Association
4. NFPA National Fire Protection Association

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria of the Work.

B. Work to Conform to:

1. Trade Practice Sections listed

a. IEEE C136.10 – Roadway Lighting Equipment - Locking-Type Photocontrol Devices and Mating Receptacle Physical and Electrical Interchangeability and Testing
b. NECA 1 – Standard Practices for Good Workmanship in Electrical Construction
c. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
d. NEMA ICS 2 – Industrial Control And Systems Controllers, Contactors And Overload Relays Rated 600 Volts
e. NFPA 70 – National Electrical Code
f. UL 508 – Standard for Industrial Control Equipment
g. UL 773A – Standard for Nonindustrial Photoelectric Switches for Lighting Control
h. UL 917 – Standard for Clock-Operated Switches

2. 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. Coordination and Pre-Installation Meeting

1. See requirements in Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

    a. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

D. Warranty: Manufacturer's standard warranty.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For each type of product indicated.
2. Shop Drawings:

    a. Show installation details for occupancy and light-level sensors.
    b. Interconnection diagrams showing field-installed wiring.

3. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
4. Warranty.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Lighting Controls
2. Hubbell Lighting.
3. Leviton Mfg. Company Inc.
4. Lithonia Lighting; Acuity Lighting Group, Inc.
5. Watt Stopper (The).
6. Engineer Approved Equal.

B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
4. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

C. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.

1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. when mounted on a 96-inch- high ceiling.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.
4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. when mounted on a 96-inch- high ceiling.
5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet when mounted on a 10-foot- high ceiling in a corridor not wider than 14 feet.

D. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.

2.2 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.3 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.4 WIRING INSTALLATION

A. Wiring Method: Comply with Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.5 IDENTIFICATION

A. Identify components and power and control wiring according to Section 26 0553 "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.6 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.7 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.8 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

D. Instruct the Owner’s personnel on the proper function and required periodic maintenance.

1. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control system specified in Section 26 0943 "Network Lighting Controls."
2. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION

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PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and understand all the requirements of Division 00 & 01 and this Section.

B. Work Included:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Load centers.

C. Related Sections:

1. Section 26 2412 "Integrated Facilities Switchboards (IFS)".

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions

1. SVR: Suppressed voltage rating.
2. TVSS: Transient voltage surge suppressor.

C. Abbreviations and Acronyms

1. ASCE American Society of Civil Engineers
2. IEEE Institute of Electrical and Electronics Engineers
3. NECA National Electrical Contractors Association
4. NEMA National Electrical Manufacturers Association
5. NETA InterNational Electrical Testing Association
6. NFPA National Fire Protection Association
7. SEI Structural Engineering Institute

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria of the Work.

B. Work to Conform to:

1. Trade Practice

a. IEEE 344 – IEEE Standard for Seismic Qualification of Equipment for Nuclear Power Generating Stations
b. IEEE C62.41 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits
c. NECA 1 – Standard Practices for Good Workmanship in Electrical Construction
d. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
e. NEMA FU 1 – Low Voltage Cartridge Fuses
f. NEMA PB 1 – Panelboards
g. NEMA PB 1.1 – General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 V or Less

h. NFPA 70 – National Electrical Code
i. SEI/ASCE 7 – Minimum Design Loads for Buildings and Other Structures
j. UL 67 – Standard for Panelboards
k. UL 489 – Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
l. UL 1449 – Standard for Surge Protective Devices
m. UL 1699 – Arc-Fault Circuit-Interrupters
n. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
o. Comply with NEMA PB 1.

2. Comply with NFPA 70.
3. Seismic Performance: Seismic tested and qualified in accordance with the 2018 International Building Code (IBC).
4. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
5. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Testing Agency Qualifications: Member company of NETA or an NRTL.

D. Project Conditions/ Environmental Controls

1. Remove loose packing and flammable materials from inside panelboards.
2. Handle and prepare panelboards for installation according to NEMA PB 1.

a. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

3. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.
b. Altitude: Not exceeding 6600 feet.

4. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

a. Notify Prime Contractor no fewer than seven days in advance of proposed interruption of electric service.
b. Do not proceed with interruption of electric service without Prime Contractor's written permission.
c. Comply with NFPA 70E.

E. Coordination and Pre-Installation Meeting

1. See requirements in Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

a. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

F. Warranty: Manufacturer’s standard warranty.

1.5 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

2. Shop Drawings: For each panelboard and related equipment.

    a. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
    b. Detail enclosure types and details for types other than NEMA 250, Type 1.
    c. Detail bus configuration, current, and voltage ratings.
    d. Short-circuit current rating of panelboards and overcurrent protective devices.
    e. Include evidence of NRTL listing for series rating of installed devices.
    f. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
    g. Include wiring diagrams for power, signal, and control wiring.

3. Qualification Data: For qualified testing agency.
4. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

    a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
    c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

5. Field Quality-Control Reports:

    a. Test procedures used.
    b. Test results that comply with requirements.
    c. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

6. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

7. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

    a. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
    b. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

8. Warranty

B. Extra Stock

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
2. Keys: Two spares for each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces.

B. Enclosures: Flush- and surface-mounted cabinets, as indicated on Drawings.

1. Rated for environmental conditions at installed location.

    a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:

    a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    b. Back Boxes: Galvanized coated material.

7. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.

C. Incoming Mains Location: Top and bottom, as indicated on Drawings.

D. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Main and Neutral Lugs: Mechanical type.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.

G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.
2. Square D; a brand of Schneider Electric.
3. Siemens Energy & Automation, Inc.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only, as indicated on Drawings.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.
2. Square D; a brand of Schneider Electric.
3. Siemens Energy & Automation, Inc.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
6. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
7. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

PART 3 - PRODUCTS

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

B. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

C. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Install panelboards and accessories according to NEMA PB 1.1.

C. Comply with mounting and anchoring requirements.

D. Mount top of trim 90 inches above finished floor unless otherwise indicated.

E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

F. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

G. Install filler plates in unused spaces.

H. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

I. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

J. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 26 0553 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
    c. Instruments and Equipment:

        1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

C. Panelboards will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.6 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

D. Instruct the Owner's personnel on the proper function and required periodic maintenance.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and understand all the requirements of Division 00 & 01 and this Section.

B. Work Included:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Wall-box motion sensors.
4. Isolated-ground receptacles.
5. Snap switches.
6. Wall-switch and exterior occupancy sensors.
7. Communications outlets.
8. Pendant cord-connector devices.
9. Cord and plug sets.
10. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

C. Related Sections include the following:

1. Section 27 1500 "Communications Horizontal Cabling" for workstation outlets.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions listed

1. EMI: Electromagnetic interference.
2. GFCI: Ground-fault circuit interrupter.
3. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
4. RFI: Radio-frequency interference.
5. SPD: Surge protection device.
6. UTP: Unshielded twisted pair.

C. Abbreviations and Acronyms listed

1. IEEE Institute of Electrical and Electronics Engineers
2. NECA National Electrical Contractors Association
3. NEMA National Electrical Manufacturers Association
4. NFPA National Fire Protection Association

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria of the Work.

B. Work to Conform to:

1. Trade Practice Sections listed:

a. IEEE C62.41.2 – Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits

b. IEEE C62.45 – Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and less) AC Power Circuits
c. NECA 1 – Standard Practices for Good Workmanship in Electrical Construction
d. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
e. NEMA WD 1 – General Color Requirements For Wiring Devices
f. NEMA WD 6 – Wiring Devices - Dimensional Specifications
g. NFPA 70 – National Electrical Code
h. NFPA 99 – Health Care Facilities Code
i. UL 20 – General-Use Snap Switches
j. UL 498 – Standard for Attachment Plugs and Receptacles
k. UL 943 – Ground-Fault Circuit-Interrupters
l. UL 1436 – Standard for Outlet Circuit Testers and Similar Indicating Devices
m. UL 1472 – Solid-State Dimming Controls
n. UL 1449 – Standard for Surge Protective Devices

2. UL 1917 – Standard for Solid-State Fan Speed Controls.
3. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
4. 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.
5. Comply with NFPA 70.
6. Receptacles for Owner-Furnished Equipment: Match plug configurations.
7. Cord and Plug Sets: Match equipment requirements.

C. Coordination and Pre-Installation Meeting

1. See requirements in Section 01 3100 – Project Management and Coordination.
2. Conduct pre-installation meeting one week before installation.

D. Warranty: Manufacturer’s standard warranty.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items. Submittals listed below are required:

1. Product Data: For each type of product indicated.
2. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
3. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.
4. Warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

5. Engineer Approved Equal.

2.2 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

B. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

C. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

2.3 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A.

2.4 TWIST-LOCKING RECEPTACLES

A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498.

B. Isolated-Ground, Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

2.5 PENDANT CORD-CONNECTOR DEVICES

A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.

1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.6 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.7 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A.

C. Pilot Light Switches, 20 A: Single pole, with neon-lighted handle, illuminated when switch is "ON."

D. Key-Operated Switches, 120/277 V, 20 A: Single pole, with factory-supplied tumbler-style key in lieu of switch handle.

2.8 OCCUPANCY SENSORS

A. Wall-Switch Sensors: Adaptive-technology type, 120/277 V, adjustable time delay up to 20 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft..

2.9 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- thick, satin-finished stainless steel.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable “in-use” cover.

2.10 FLOOR SERVICE FITTINGS

A. Type: Modular, flap-type, dual-service units suitable for wiring method used.

B. Compartments: Barrier separates power from voice and data communication cabling.

C. Service Plate: Rectangular, solid brass with satin finish.

D. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.

E. Voice and Data Communication Outlet: Two modular, keyed, color-coded, RJ-45 Category 6 jacks for UTP cable.

2.11 POKE-THROUGH ASSEMBLIES

A. Description: Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service outlet assembly.

1. Service Outlet Assembly: Flush type with two simplex receptacles.
2. Size: Selected to fit nominal 3-inch cored holes in floor and matched to floor thickness.
3. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
4. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors.

2.12 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: Gray, unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Emergency Power System: Red.
3. SPD Receptacles: Blue.
4. Isolated-Ground Receptacles: Orange.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

3.2 INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

C. Coordination with Other Trades:

1. Take steps to ensure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

D. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail, or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

E. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

F. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

G. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings.

3.3 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

3.5 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

D. Instruct the Owner’s personnel on the proper function and required periodic maintenance.

END OF SECTION

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SECTION 26 5119
LED LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings and general provisions of the Contract, including General Conditions and Division 00 & 01 Specification Sections, apply to this Section. Any Contractor/Supplier who submits a bid, enters into a contract and/or provides work described in this Section acknowledges that they have read and understand all the requirements of Division 00 & 01 and this Section.

B. Work Included:

1. Solid-state luminaires that use LED technology.
2. Lighting fixture supports.

C. Related Requirements:

1. Section 26 0923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Section 26 2416 "Panelboards" for panelboards used for lighting control.

1.2 REFERENCES

A. See Section 01 4200 – References, for all Abbreviations, Acronyms, ANSI & ASTM standards, Specialty Codes and Trade Practices that are referenced herein.

B. Definitions:

1. See Section 01 4200 – References, for universal definitions related to the Work.
2. CCT: Correlated color temperature.
3. CRI: Color Rendering Index.
4. Fixture: See "Luminaire."
5. IP: International Protection or Ingress Protection Rating.
6. LED: Light-emitting diode.
7. Lumen: Measured output of lamp and luminaire, or both.
8. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 QUALITY ASSURANCE

A. See Section 01 4000 – Quality Requirements, for general quality criteria of the Work.

B. Work to Conform to:

1. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
2. Provide luminaires from a single manufacturer for each luminaire type.
3. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

C. Project Conditions/ Environmental Controls:

1. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

D. Coordination and Pre-Installation Meeting

1. See requirements in Section 01 3100 – Project Management and Coordination.

2. Conduct pre-installation meeting one week before installation.

E. Warranty

1. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
2. Warranty Period: Five year(s) from date of Substantial Completion.

1.4 SUBMITTALS

A. All submittals under the provisions of Section 01 3300 – Submittal Procedures, unless noted otherwise. Refer to Section 01 3300 – Submittal Procedures, Paragraph 3.1, for descriptions of submittal items.

B. Submittals listed below are required:

1. Product Data: For each type of product.

   a. Arrange in order of luminaire designation.
   b. Include data on features, accessories, and finishes.
   c. Include physical description and dimensions of luminaires.
   d. Include emergency lighting units, including batteries and chargers.
   e. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
   f. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project IES LM-79 and IES LM-80.

      1) Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
      2) Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

2. Shop Drawings: For nonstandard or custom luminaires.

   a. Include plans, elevations, sections, and mounting and attachment details.
   b. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   c. Include diagrams for power, signal, and control wiring.
   d. Include Samples of luminaires and accessories to verify finish selection.

3. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.
4. Qualification Data: For testing laboratory providing photometric data for luminaires.
5. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

   a. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

6. Warranty

C. Extra Stock:

1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   a. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.

b. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

D. Recessed Fixtures: Comply with NEMA LE 4.

E. Bulb shape complying with ANSI C79.1.

F. Lamp base complying with or IEC 60061-1.

G. CRI of 80. CCT of 3000 K.

H. Rated lamp life of 50,000 hours.

I. Lamps dimmable from 100 percent to 0 percent of maximum light output.

J. Internal driver.

K. Nominal Operating Voltage: 120 V ac or 277 V ac as indicated on Drawings.

1. Lens Thickness: At least 0.125 inchminimum unless otherwise indicated.

2.2 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers and Globes:

1. Prismatic glass
2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Glass: Annealed crystal glass unless otherwise indicated.
4. Lens Thickness: At least 0.125 inchminimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.

2. Clear anodized finish.

E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.
b. Lamp diameter, shape, size, wattage, and coating.
c. CCT and CRI for all luminaires.

2.3 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.4 LUMINAIRE FIXTURE SUPPORT COMPONENTS

A. Comply with requirements in Section 26 0529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inchsteel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before installation, verify substrate and adjoining work is ready to receive installation of the Work under this Section, per Section 01 4000 – Quality Requirements, Article 3.3 Inspections.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

A. General: Install according to the manufacturer's written instructions/ recommendations approved during the shop drawing submittal process.

B. Comply with NECA 1.

C. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

D. Install lamps in each luminaire.

E. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

F. Flush-Mounted Luminaire Support:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

G. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.

H. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with two 5/32-inch-diameter aircraft cable supports adjustable to 120 inches in length.

I. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

J. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of two locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of two locations, spaced near corners of luminaire.

K. Comply with requirements in Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Coordinate "Operational Test" Subparagraph below with requirements in Section 26 0923 "Lighting Control Devices."
2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
3. Adjust the aim of luminaires in the presence of the Architect.

3.7 POST-INSTALLATION REQUIREMENTS

A. Clean the Work and affected adjacent materials per the manufacturer’s written instructions.

B. Protect the Work per Section 01 4000 – Quality Requirements, Article 3.5 Protection.

C. Dispose of and manage construction waste per Section 01 7419 – Construction Waste Management.

D. Instruct the Owner’s personnel on the proper function and required periodic maintenance.

END OF SECTION

EARTHWORK AND RESTORATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Providing all materials, labor, services and incidentals necessary for the completion of this Section of the Work.

B. Clearing, grubbing, excavation, placing compacted fill (excluding granular base courses of paved areas), gravel surfacing if applicable, topsoil, site protection and restoration indicated on the drawings and in this Section.

C. Arranging and paying for the services of an independent soils technician. The soils technician shall observe excavations, filling and compaction, as well as perform the required tests as per the Contract Documents.

1.3 STANDARDS

A. Minnesota Department of Transportation (MNDOT) Standard Specifications for Construction, latest edition.

1. The Contractor shall obtain a copy of MNDOT's Standard Specifications for Construction and review the specification sections applicable in the plans. It is mandatory that the Contractor be knowledgeable of the applicable MNDOT specification sections during construction. No additional compensation will be paid to the Contractor for additional work due to unfamiliarity with the applicable specification sections.

1.4 RELATED SECTIONS

A. Section 03 3300 "Cast-in-Place Concrete"

1.5 PROTECTION

A. The Contractor shall maintain all benchmarks, monuments and other reference points. If any are disturbed or destroyed, they shall be replaced at the Contractor's expense.

B. The Contractor shall contact the Engineer immediately if any unknown functioning underground utilities are discovered during the course of the project, which may interfere with construction. The Contractor shall wait for instructions before proceeding.

C. The Contractor shall be responsible for any damage to functioning underground or overhead utility lines. Damaged utilities shall be repaired immediately and services restored at no additional cost to the Owner.

D. The Contractor shall provide barricades, shoring and other safety measures required by OSHA.

E. The Contractor shall protect all adjacent existing facilities from damage including, but not limited to, settlement due to excavations, erosion, etc. The Contractor shall be responsible for repair of such damages.

1.6 PROJECT CONDITIONS

A. The Contractor shall become familiar with the project site, and compare actual conditions in the field with those shown on the Project Drawings. The Contractor shall contact the Engineer immediately if any inconsistencies are found between the existing conditions and the Project Drawings.

B. No extra compensation will be allowed due to unusual conditions, which could have reasonably been determined or anticipated by examination of the Project Site and Project Drawings.

PART 2 – PRODUCTS

2.1 MATERIALS: BUILDING RELATED

A. FOUNDATION WALL BACKFILL: material shall be clean, free draining material with less than 10% fines compacted to a minimum of 95% of its maximum standard proctor density D698.

B. SUB-SOIL BELOW FOOTINGS AND SLAB: All fill materials not considered suitable for support should be removed below the building areas. Oversize excavations by at least one foot (1') beyond edges of footings for each foot of fill needed below footing grade. Use clean gravel/sands having at least 10% particles passing a no. 200 sieve. Compacted to 95% of its maximum proctor density.

C. SAND CUSHION: A six inch (6") minimum sand cushion shall be placed beneath building floor slabs and exterior concrete work. The material shall be fine-grained material with at least five (5%) to thirty (30%) percent of the particles passing a number 200 sieve but not contaminated with clay, silt or organic material. All material below the building shall be compacted to a minimum of 95% of its maximum standard proctor density ASTM D698.

2.2 MATERIALS: EXTERIOR CONSTRUCTION RELATED

A. FILL AND BACKFILL MATERIALS:

1. Sub-grade material under, parking lots, sidewalks and driveways shall be approved inorganic soil material free from roots, rocks, boulders, and debris.
2. Bedding material or granular backfill larger than 2-inches in its largest dimension shall not be allowed within 2-feet of new underground pipes. Material larger than 3-inches in its largest dimension shall not be allowed within 1-foot of subgrade elevation.

B. COMPACTED FILL MATERIAL

1. Imported compacted fill materials shall have a maximum of 12% passing the #200 sieve by weight.
2. Proposed fill material shall be tested by an independent testing lab for suitability as compacted fill for this project. The Contractor shall pay for the testing services and provide copies of all test results to the Engineer.

C. TOPSOIL:

1. Good quality imported and/or stockpiled salvageable topsoil shall be utilized for this project.
2. Topsoil shall be free of clay lumps, roots, brush, large stones, and debris, and shall have a minimum organic content of 5 percent.
3. Stockpile topsoil separate from other excavated material.

2.3 ACQUISTION OF MATERIALS

A. Insufficient Materials: Provide necessary material from off the site, as approved by the Architect/ Engineer and Geotechnical Engineer to complete the Work. The cost of these materials shall be considered part of the Base Bid Contract.

B. Exterior Backfill: Clean, on-site materials obtained from the required stripping, contour cutting and excavation may be used for backfill and grading.

C. Subsoil for Site Grading: Clean, on-site materials obtained from the earthwork operations.

D. Under-slab Fill: Obtain from on or off the site as approved by the Laboratory Inspector.

E. Fill: Obtain from on or off the site as approved by the Laboratory Inspector.

F. Borrow pits: Borrow pits will not be permitted on this project.

G. Disposition of Materials:

1. Surplus Earth: Unless designated elsewhere for use or disposal on the Owner's property, surplus earth becomes the property of the Contractor and shall be removed from the Owner's site. The cost of off-site disposal shall be considered part of the Base Bid Contract.
2. The Contractor shall not be allowed to take advantage of the stated tolerances by

maintaining a consistently high or low elevation.

2.3 MATERIAL BALANCE

A. The Contractor is responsible for determining the quantities of material necessary for completing the Work under this Section. This includes the cost of importing approved fill or exporting excess materials.

PART 3 – EXECUTION

3.1 PLAN GRADES AND PREPARATION

A. Elevations shown on the Project Drawings are finished grade elevations, unless indicated otherwise. Elevations not specifically noted shall be determined by interpolation of uniform slopes between spot elevations and/or contours, or between such points and existing elevations. Adequate slope shall be graded to provide positive drainage away from the building.

B. In any inconsistencies exist on the plans between contours and spot elevations, the spot elevations shall govern.

C. Identify known underground, above ground and aerial utilities. Stake and flag utility locations. Protect above and below-ground utilities which are to remain.

D. Verify that erosion control devices are in place.

E. Verify limits of construction and accurately locate the site boundaries, building perimeter and paved areas.

F. Protect trees, plant growth, and features designated to remain as final landscaping.

G. Protect benchmarks, existing structures, fences, sidewalks, paving, curbs and other items indicated on the Drawings to remain.

3.2 CLEARING

A. The Contractor shall remove all vegetation within the limits of the building and all trees that may hinder new construction work. All vegetation shall be removed from other exterior improvements, as well. The removal of existing trees outside building lines shall be approved by the Architect or Engineer. Remove all trees including stumps and root systems as indicated in the Contract Documents.

3.3 STRIPPING TOPSOIL

A. Remove topsoil to its entire depth from areas, which are to be disturbed by new construction work. Existing lawn areas, which are not in the proposed construction area(s), shall remain in place.

B. The Contractor shall field verify topsoil depths between any available soil borings, and remove to greater depths than indicated in the soils report if such conditions are encountered. Salvaged topsoil shall be maintained in stockpiles.

C. Stockpiled topsoil shall only be used for finish grading of new lawn areas. Excess topsoil shall be removed from the site by the Contractor.

D. Protect all existing lawn areas, plantings and other landscaping designated to remain in place. Any damaged areas shall be replaced at the Contractor's expense.

3.4 BUILDING EXCAVATIONS

A. Oversize excavations at least two feet (2') from face of building plus one foot (1') horizontally for each one foot (1') of excavation below finish floor grade.

B. Protect and brace existing footings before performing soil corrections within the zone of influence below the existing footings. The zone of influence is defined as the area below a line commencing three feet (3') outside the footing elevation and extending down at a slope of one foot (1') vertical for each foot horizontal. The Contractor shall stop and consult the Geotechnical Engineer and Structural Engineer if it appears that soil correction is required within the zone of influence of the existing footings.

C. Stablizing Sides of Excavation: Slope the sides of excavations to a safe angle of repose for materials being excavated. Shore and brace where sloping is not possible because of space restrictions or the stability of the materials being excavated. Maintain the sides of the

excavation in a safe condition until the completion of backfilling.

3.5 UNFORSEEN OBSTACLES

A. The Engineer shall be contacted immediately if any unforeseen major obstacles are encountered during excavation, such as abandoned wells, abandoned or functioning utilities, sub-surface streams or rock, etc., which would add significant expense to the Contractor.

B. The Contractor shall still be responsible for completing all work required for this project where encountered conditions may be reasonably determined from a soils/geotechnical report, and review of the project site and contract documents.

3.6 DEWATERING

A. Surface drainage shall be provided during construction in a manner so as not to create a nuisance to adjacent areas.

B. All excavations shall be free of water during construction within the excavations. Dewatering shall be accomplished by pumping or trenching, and shall be conducted regardless of the cause, source, or nature of the water.

C. Berms, cofferdams or piling shall be provided as necessary to protect excavations.

D. Excavations shall be sloped to drain, and necessary pumps, hoses, and other equipment shall be provided to keep excavations free of water.

E. All temporary equipment used for dewatering shall be removed from the site when no longer necessary.

3.7 FILLING AND GRADING FOR PAVED ROADWAYS WALKWAYS AND PARKING AREAS

A. Rough grading of all areas within the construction limits, including adjacent transition areas, shall be reasonably smooth and compacted. The rough graded subgrade surface generally shall not be more than 6-inches above or below the established subgrade elevation. All ditches, swales, and gutters shall be graded to drain adequately. The Contractor shall provide rounded transitions at tops and bottoms of banks and other breaks in grade.

B. Rough graded areas adjacent to building walls shall be a minimum of 6-inches below the building's finished floor elevation (FFE). Slope shall be graded to provide positive drainage away from building walls at a minimum grade of 1%.

C. The Contractor shall fill and grade as necessary to bring surfaces to required elevations, and provide all materials necessary, whether obtained on or off the project site.

D. The Contractor shall place compacted material in uniform horizontal lifts not exceeding 8" in depth for clay soils, and 12" in depth for sandy soils, and compact as required to achieve specified density (See 3.8 below).

E. Compaction shall be obtained with the use of vibratory rollers or rammers. During compaction, fill material shall contain moisture content as necessary for the required compaction, as indicated by an independent testing lab. The moisture shall be uniform throughout each lift. If the material is too dry, water shall be added with approved equipment and methods, which will not wash out fine material. If the material is too wet, it shall be dried by harrowing, discing, blading, or other approved methods recommended by the independent testing lab.

F. Areas designated for pavement or sidewalk in excavated (cut) areas shall be scarified to a depth of 1 foot. The Contractor shall bring the subgrade material to optimum moisture content as indicated by the independent testing laboratory and compact the subgrade to the specified density listed below for soils underneath pavements.

G. The Contractor shall place no fill material when either the fill material or the material on which it is to be placed is frozen. Any soft or yielding spots appearing in the fill resulting from frost, rain, or any other reason whatsoever shall be scarified, removed, recompacted and/or otherwise rectified to the satisfaction of the Engineer before any new fill is placed.

H. Refer to the soil report, if any, for further recommendations.

3.8 FILLING AND GRADING FOR BUILDING AREAS

A. Remove surface topsoil from building pad areas that was not removed under Site Clearing. No additional compensation will be allowed for this work.

B. The Contractor shall thoroughly review the Geotechnical Report, Grading Plans, Structural Plans and Specifications to determine the depth of excavation and any soils correction

required. No additional compensation will be given for work that could have been anticipated by reviewing the above documents.

3.9 COMPACTED FILL

A. Prior to the placement of fill, the Geotechnical Engineer must inspect and approve the bottom or bearing surface of each excavation. Once approved, the exposed surfaces shall be scarified to a depth of not less than six inches (6") and then compacted to at least 100% Standard Proctor Density.

B. Before placing fill on a slope greater than five (5) horizontally to one (1) vertically (5:1), the Contractor shall, at their option: (a) flatten the existing slope to the extent that it will not be steeper than 5:1; or (b) construct steps in the slope, with back surface being as nearly vertical as practicable and with the horizontal cuts being made as close together as the slope permits, but with no step being less than ten feet (10') in width.

C. Fill shall not be placed on frozen ground, nor shall filling operations continue when the temperature is such as to permit the layer under placement to freeze.

D. Deposit approved fill in uniform layers not exceeding eight inches (8") (loose) thickness. Compact each layer with approved methods and equipment.

E. The fill material, when being compacted, shall contain the moisture content necessary for the required compaction as designated by the Geotechnical Engineer. The soil shall be moisture conditioned to within 2% of optimum moisture content. The moisture shall be uniform throughout each layer.

F. Scarify, remove, recompact or otherwise rectify all soft or yielding areas resulting from construction operations, rain or other sources at no additional cost to the Owner.

G. Compaction of Trenches for Underground Piping:

1. General Requirements: Place the fill and compact in connection with the installation of the underground plumbing pipe in the Mechanical Contract as follows:
   a. Exterior: Refer to Civil Documents
   b. Interior: Refer to Mechanical Specifications

H. Coordination: the General and Mechanical Contractors shall cooperate in the digging, backfilling and compacting operations.

3.10 COMPACTION TESTS

A. Utility Trench Backfill: The Contractor's independent soils technician and approved testing laboratory shall perform in-place density and moisture tests at random depths in trench backfill at 100 foot intervals, or fraction thereof. Compaction of trench backfill shall be a minimum of 95% of the maximum dry density (as determined by the independent testing lab) in lawn areas, and at depths greater than 3-feet in areas designated for pavement. Compaction of trench backfill within 3-feet of paved surfaces shall be a minimum of 100% of the maximum dry density.

B. Compacted Fill Under Pavements: Compaction tests shall not be required beneath new pavements. Adequate compaction of materials beneath pavements shall be determined by test rolling the subgrade, and checking for excessive rutting. Test rolling shall be performed as per MNDOT Spec. 2111.

C. 95% Standard Proctor Density (ASTM D698) below footings.

D. 95% Standard Proctor Density (ASTMD698) below building floor slabs.

E. Areas exhibiting a failed compaction test shall be recompacted and retested to the satisfaction of the Engineer prior to acceptance of the project.

F. Copies of all compaction testing and test roll observation reports shall be provided to the Engineer.

G. Optimum moisture-density relationships will be determined by the independent testing laboratory in accordance with ASTM D698 and maximum density determination made by Method D of ASTM D698 unless otherwise noted in these specifications.

3.11 COMPACTION DENSITY REQUIREMENTS

A. Compaction of all fill and backfill shall meet or exceed the following percentages of Standard Proctor Density (ASTM D698)

1. 95% below footings.
2. 95% below building floor slabs.

3.12 SUBGRADE PREPARATION

A. Finished subgrade elevations shall be as follows:
   1. Lawn areas: 4" below finished grade (see section 3.3 B).
   2. Planting areas: See Landscape Plan/Details: 9" below finished grade.
   3. Bituminous pavement areas: 27” below finished grade.
   4. Concrete walk areas: 8" below finished grade.

B. The tolerance for areas to be paved shall not exceed 0.15-feet above or below plan subgrade.

C. The Contractor shall protect newly graded subgrade areas from erosion. Settlement or washing that occurs prior to acceptance of the Work shall be repaired and grades re-established.

3.13 DISPOSAL OF EXCESS WASTE MATERIALS

A. The Contractor shall remove excess excavated material, trash, debris and waste materials, from the Owner's property and legally dispose of it in accordance with all governing codes.

3.14 SPREADING TOPSOIL AND FINISH GRADING

A. Scarify subgrade to depth of 3" prior to placing topsoil. Spread topsoil evenly over complete subgrade as follows:
   1. Lawn Areas on Private Property: Spread 4" lightly compacted layer of topsoil.
   2. Lawn Areas in Public Right-of-way: Per City requirements
   3. Planting Areas: ALL DISTURBED AREAS SHALL BE PLANTED

B. Finish grade accurately within 0.15-feet of finish grade elevations shown on the project drawings, less the thickness of any sod where it is to be installed. Slope all grades away from buildings at a minimum grade of 1% to provide positive drainage.

C. Prepare topsoil suitable to receive seed and/or sod. Grading of areas designated for topsoil shall be reasonably smooth and even, and in accordance with MNDOT Spec. 2105.3G. All debris and stones exceeding 3-inches in its largest dimension shall be removed from the soil surface of these areas prior to seeding. Areas compacted by vehicles or storage of materials shall be plowed, disked, and harrowed to match texture of other finish graded areas. The finished topsoil surface shall be sufficiently smooth prior to seeding such that a small push-lawn mower can navigate the areas with no problems.

END OF SECTION 31 1000

UNIT PAVING

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS
- A. Drawings and general provisions of Contract, including Division 00 Procurement and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:
- A. Description of System
  1. Furnish all material, labor and equipment and perform all work to completely install paving brick to be used in either flexible pavement system for pedestrian/light traffic in all areas designated in the drawings.
- B. RELATED SECTIONS
  1. Division 31 Section: Earthwork
  2. Division 03 Section: Cast-in-Place Concrete

1.3 QUALITY ASSURANCE:
- A. Reference:
  1. B1A Technical Note Series No. 14.
  2. B1A Brick Paver Installation Guides.
- B. Brick Tests:
  1. Test in accordance with ASTM C 67, with the following additional requirements:
     a. Brick shall meet the requirements of either the abrasions index or volumetric abrasion loss. The brick shall meet the requirements for the applicable traffic or installation intended. The abrasion index is calculated from the cold absorption in percent and the compression strength in pounds per square inch as follows:

     $$\text{Abrasion Index} = \frac{100X \text{ Absorption}}{\text{Compression Strength}}$$

     b. Cost of tests of units after delivery shall be borne by the purchaser, unless tests indicated that units do not conform to the requirements of the specifications, in which case cost shall be borne by the seller.
- C. Furnish Sample Panel:
  1. Approximately 4 ft. (1.2m) long by 4 ft. (1.2m) wide, showing the proposed brick paver size, color range, texture, bond pattern, mortar (where applicable) and workmanship. All brick paver shipped for the sample panel shall be included in the panel.
  2. Construct brick paver panel in the presence of the architect, engineer or owner's representative before installation of materials.
  3. When required, provide a separate panel for each type of brick paver or mortar (where applicable).
  4. Do not start work until architect, engineer or owner has accepted the sample panel(s).
  5. Use panel(s) as standard of comparison for all brick paving work constructed of same material.
  6. Do not alter or destroy approved panel(s) until work is completed and accepted by the owner or owner's representative.

1.4 SUBMITALS:
- A. Samples: Furnish not less than five (5) individual brick pavers samples (in each color specified), showing extreme variations in color and texture.
- B. Test Reports:
  1. Test reports for each type of paving brick are to be submitted to the architect, engineer or owner's representative for approval.
  2. Testing and reports are to be completed by an independent laboratory.

3. Test reports shall show:
   a. Modulus of Rupture (for units complying with ASTM C-1272)
   b. Compressive Strength
   c. 24 Hr. Cold Water Absorption
   d. Saturation Coefficient (for units complying with ASTM C-902)
   e. Weather Classification (for units complying with ASTM C-902)
   f. Efflorescence

C. Certificates: Prior to delivery, submit to architect, engineer or owner's representative certificates attesting compliance with the applicable ASTM Specifications for physical requirements and weathering classification.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Prior to installation store paver brick off of the ground to prevent contamination by materials likely to cause staining or other defects.

B. Prior to installation cover paver brick and sand materials with waterproof covering when necessary to protect from the elements.

C. Prior to installation store different type of aggregate separately.

PART II – PRODUCTS

2.1 CLAY PAVING BRICK:

A. All paving brick specified or shown on drawings shall be Belcrest 560 Pavers- as manufactured by The Belden Brick Company, P. O. Box 20910, Canton, Ohio 44701-0910. Provide paver samples for owner/architect approval.

B. Prior Approved Equal.

1. Pedestrian and Light Traffic Paving Brick shall conform to the latest revision of ASTM C 902 09, pedestrian and light traffic application.
   a. Dimensions: 2 ¼" thick x 3 5/8" wide x 7 5/8" length.
   b. Provide special shapes, ie.: coping units, stair tread units, etc. as specified or shown on drawings to conform to the specified paving brick in color, texture and size when applicable.
   c. Provide brick similar in texture and physical properties to those available for inspection at the architect's, engineer's or owner's representative office.

2.2 BASE MATERIAL

A. Base material selection shall be determined in part, by the pavement system specified which is dependent on both known and anticipated traffic loads and specific site conditions.

1. Base material for brick paving systems specified under ASTM C 902 (Pedestrian and Light Traffic Paving Brick), shall be in accordance with BIA recommendations:
   a. "Semi-Rigid Continuous Bases" which shall be in accordance with BIA recommendations.
   b. "Rigid Bases" which shall be in accordance with BIA recommendations.
2. Base material for brick paving systems specified under ASTM C 1272 (Heavy Vehicular Paving Brick) shall be in accordance with the requirements of the American Association of State Highway and Transportation Official (AASHTO), local road guidelines and any other governing guidelines that are applicable for both 'rigid' and 'semi-rigid continuous' bases.

2.3 BEDDING SAND (CUSHION MATERIAL)

A. Sand used as a cushion material shall conform to ASTM C 33- Specification for Concrete aggregates. (Note: Mason's sand, slag, limestone screenings and stone dust should not be specified because they do not compact well and they may cause efflorescence.)

2.4 JOINTING SAND

A. Spaces between brick pavers in 'flexible paving systems' shall be filled with washed mason sand smaller than the bedding course material and graded to the limits of ASTM C 144-Aggregates for Masonry Mortar.

2.5 JOINTING AND BED MORTAR

A. Spaces, between brick pavers in 'Rigid' Paving Systems shall be constructed with mortars conforming to ASTM C 270 for at or below grade for exterior applications and also latex-modified mortars.

PART III – EXECUTION

3.1 INSPECTION

A. Prior to the installation of the brick paving system, the paving contractor shall check and verify that the base material has been properly prepared and that the specified elevation, grade and slope for drainage comply with the project specifications.

3.2 INSTALLATION OF FLEXIBLE BRICK PAVING SYSTEM

A. Spread concrete sand over base and screed to 1" thickness ± ¼". The screed sand should not be disturbed.
B. Edge restraints shall be installed to the proper elevation for the 'Flexible Brick Paving System' specified. Edge restraints are to be installed in a manner to eliminate any possible lateral (horizontal) movement of the 'Flexible Brick Paving System.'
C. Lay pavers in the pattern(s) as indicated in the drawings maintain straight lines.
D. Fill out area with cut pavers along edge restraints or interruptions.
E. Vibrate the brick pavers into the sand using a plate vibrator capable of 3000 to 5000 lbs. centrifugal force. The plate vibrator must have a rubber plate or roller feet to avoid chipping the pavers.
F. After the first pass of the plate vibrator, sweep mortar sand into the joints and vibrate again. Repeat the process until the joints are full.
G. Do not vibrate within two feet of all unrestrained edges.
H. Sweep excess sand off of pavement.

Note: 1 – Chamfered or rounded edged pavers, although not always available in all paving bricks manufactured, reduce chipping along the top edges of the paver.
2 – For use of molded brick (containing 'frogs' or depressions in the bed surface of the brick) in 'flexible brick paving systems' contact the manufacturer for additional recommendations.

3.3 TOLERANCES

A. The final surface elevation shall be flush with adjacent construction.
B. Maximum variation in level shall be within ± 3/8" in 10 feet.

END OF SECTION 32 1400

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SECTION 32 16 00 – CONCRETE PAVEMENT, CURB & GUTTER, AND SIDEWALK

PART 1 - GENERAL

1.1 WORK INCLUDES:
- A. Provide all materials, labor, services and incidentals necessary for the completion of this Section of the Work.
- B. Use for site related concrete work including concrete pavements, curb & gutter, sidewalks, concrete spillways, aprons, ramps and incidental concrete, as designated on the Project Drawings.

1.2 STANDARDS
- A. The following standards shall apply to this project:
  1. American Concrete Institute (ACI)
  2. American Society for Testing Materials (ASTM)
  3. Minnesota Department of Transportation (MNDOT) Standard Specifications for Construction, latest edition
- B. The Contractor and the Contractor's Supplier shall obtain copies of the applicable portions of the standards listed above and review them as they relate to this project. It is mandatory that the Contractor be knowledgeable of the applicable standards during construction. No additional compensation will be paid to the Contractor for additional work due to unfamiliarity with the applicable portions of the standards listed above.

PART 2 - PRODUCTS

2.1 GRANULAR BASE COURSE MATERIAL
- A. Compacted thickness of finished base: 6" – Concrete pavement/apron
  4" – Concrete sidewalk
- B. Base material of pavements shall be MNDOT Class 5 aggregate base
- C. Base material of aprons and sidewalk shall be granular with less than 12% passing the #200 sieve by weight.

2.2 PORTLAND CEMENT - ASTM C150, Type I plus an approved air entraining agent, or Type IA air-entraining Portland cement.

2.3 AGGREGATES
- A. Coarse: MnDOT Spec. 3137.
- B. Fine: MnDOT Spec. 3126.

2.4 WATER - Clean, fresh and potable, MnDOT Spec. 3906.

2.5 AIR ENTRAINING ADMIXTURES - ASTM C260.
- A. Provide entrainment of 4 - 7 percent by volume.

2.6 OTHER ADMIXTURES - MnDOT Spec. 3113.

2.7 Calcium Chloride or materials containing chlorides or nitrates - not allowed.

2.8 DEFORMED REINFORCING BARS
- A. MnDOT Spec. 3301

2.9 WELDED WIRE FABRIC
- A. MnDOT Spec. 3303

2.10 ACCESSORIES
- A. Properly sized chairs, spacers, bolsters, etc.
- B. Provide plastic coated accessories at slabs and beams that are exposed below.

PART 3 - EXECUTION

3.1 PROPORTIONING AND DESIGN OF MIXES - MnDOT Specs. 2301 and 2461
- A. Concrete Classifications
  1. Curb and gutter, slip-formed concrete: MNDOT 2461, Mix Design 3F32
  2. Sidewalk, aprons, incidental concrete, manual curb & gutter: MNDOT 2461, Mix

Design 3F52

3. Concrete pavements: MNDOT 2301, Mix Design 3A41
4. Repair concrete, fast strength concrete: MNDOT 2301, Mix Design 3A41HE

B. Concrete Specifications:
1. 3F32: 1½ -3" slump, 4500 psi, 5-8% air
2. 3F52: 2-5" slump, 4500 psi, 5-8% air
3. 3A41: 2-5" slump, 4500 psi, 5-8% air
4. Temperatures of all concrete during placement shall be 50°F to 90°F

3.2 REINFORCEMENT PLACEMENT

A. Place, support and tie reinforcing to prevent displacement. Reinforcing shall be clean of oil, grease, scale, rust or other coatings which will impair the bond.

B. Reinforcing shall not be welded nor shall accessories of any kind be welded to reinforcing bars, unless approved by the Engineer.

C. Welded wire fabric shall be lapped a minimum of 2 squares plus 2". Welded wire fabric shall be suspended completely in the concrete and shall not be allowed to rest on subgrade at any point.

D. Concrete cover over reinforcement, bend radii, etc. shall be in accordance with the guidelines of ACI 318. Specifically, minimum clear cover shall be as follows unless otherwise noted on the Project Drawings:
1. Concrete cast against and permanently exposed to earth: 3"
2. Concrete exposed to earth or weather: 1½" (#5 and smaller), 2" (#6 and larger)
3. Concrete not exposed to weather or in contact with ground: ¾"

E. Lap splices shall be a length of 40 bar diameters unless noted otherwise on the Project Drawings. When two bars of different diameter are spliced, use 40 diameters of the smaller bar.

F. Reinforcing shall be continuous at all footing steps and stepped bond beams. Lap splices may be used.

3.3 CONCRETE PLACEMENT

A. Place concrete as soon as possible after mixing. Place before initial set has occurred, and in no event after it has contained its water content for more than one hour.

B. Avoid overworking concrete or allowing concrete to fall unrestricted for excessive vertical distances, and other situations which can cause segregation of the aggregates.

C. Concrete pavements shall be placed in accordance with applicable portions of MnDOT 2301.

D. Sidewalks shall be placed in accordance with MnDOT 2521.

E. Curb and gutter shall be placed in accordance with MnDOT 2531.

3.4 PROTECTION

A. Provide adequate protection against rain, sleet and snow before and during placement and finishing of concrete.

B. Protect concrete from premature drying. Provide temporary covering as required. Keep concrete continuously moist for 7 days

C. Treat concrete with membrane curing compound in accordance with MnDOT 2531.3G

3.5 COLD WEATHER CONCRETE

A. Do not place concrete when the atmospheric temperature is below 40 degrees F., or when the concrete is likely to be subjected to freezing temperatures within 24 hours after it has been deposited unless adequate temporary heating is provided.

B. Maintain concrete temperature of 40 to 90 degrees F. for 3 days. Protect from freezing for the following 5 days.

C. No frozen materials may be used in the concrete. Chemicals may not be used to prevent freezing unless approved by the Engineer.

D. Perform all cold weather concreting in accord with ACI 306.

3.6 HOT WEATHER CONCRETE

A. Do not place concrete when the atmospheric temperature is above 100 degrees F.

B. Maintain concrete temperature of 40 to 90 degrees F. for 3 days. Protect from temperatures over 90 degrees for the following 5 days.

C. Thoroughly wet dry porous surfaces before concreting.

D. Water reducing admixtures with retarding properties are required for all concrete placed when the temperature exceeds 80 degrees F.

E. Perform all hot weather concreting in accord with ACI 305.

3.7 FINISHING

A. Provide a broomed finish on exterior sidewalks and ramps unless noted otherwise.

3.8 QUALITY CONTROL: The Contractor shall hire an independent testing firm to provide the following tests:

A. The independent testing technician shall perform random field testing of the fresh concrete including slump, air content, and temperature. (ASTM C143, C173, C231 and C138). One series of the aforementioned tests shall be performed on the first load of concrete.

B. The independent testing technician shall cast a set of four compression test cylinders for the first load of concrete as well as 1 set for every 100 cubic yards, or fraction thereof, of concrete thereafter. Compression tests shall be performed on one test cylinder at 7 days and two test cylinders at 28 days. The fourth test cylinder shall be retained in the event of failing compression tests on the 28-day test cylinders.

END OF SECTION

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TURF AND GRASSES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Division 00 Bidding and Contracting Requirements, Division 01 General Requirements and Technical Specification sections, apply to work of this section.

1.2 SUMMARY

A. Scope:
   1. Provide and install.
      a. Stockpile and new topsoil
      b. Final smoothing of topsoil
      c. Seeding and/or Hydroseeding

B. Related Sections:
   1. Division 31 Section “Earthwork”

1.3 SUBMITTALS

A. Shop Drawings: Submit planting plan and schedule.

B. Samples: Not Required.

C. Acceptable Manufacturers:

1.4 QUALITY ASSURANCE

A. Codes and Standards: AAN.

B. Testing: Not required.

C. Guarantee: Required on lawns until end of maintenance period.

PART 2 PRODUCTS:

2.1 MATERIALS:

A. Approximately 4” of topsoil to be stockpiled for re-use in landscape work. Respread and fine grade existing 4”; add 2” of new topsoil by landscape contractor.

B. Fertilizer, certified commercial containing 10-6-4 (Nitrogen-Phosphate-Potash).

C. Grass Materials: Provide fresh, clean, new-crop grass seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. The mixture to be used shall be proportioned by weight and sown at a rate of 5 lbs (2.3 kg) per 1,000 sf (92.9 sq.m.)
   1. General Lawn and Field Areas:

Pennlawn Fescue	35%
Red Top	15%
Improved Kentucky Blue Grass	50%
	100%

D. Miscellaneous Landscape Materials:
   1. Erosion Control Blanket to comply with MnDOT Standard Spec 3885.

PART 3 EXECUTION:

3.1 PREPARATION:

A. Remove stones measuring over ¾" in any dimension. Remove sticks, roots, rubbish, and other extraneous matter. Add specified soil amendments and mix thoroughly into upper 4" of topsoil. Topsoil to receive light rolling and add additional topsoil to bring up to grade. Allow for sod thickness in areas to be sodded.

B. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake, and drag lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake, and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

3.2 SEEDING:

A. Sow seed at the rate indicated.

B. Provide Erosion Control Blanket as required.

3.3 RECONDITIONED EXISTING LAWNS & SITE COVER

A. Recondition all existing lawn and existing site cover areas wherever damaged by Contractor's operations including storage of materials and equipment and movement of vehicles. Also recondition existing lawn areas where minor regarding is required.

B. Provide fertilizer, seed or sod, and soil amendments as specified for new lawns, and as required, to provide a satisfactorily reconditioned lawn.

C. Provide new topsoil, as required, to fill low spots and meet new finish grades.

D. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.

E. Where substantial lawn remains, but is thing; mow, rake, aerate if compacted, fill low spots, remove humps, and cultivate soil, fertilize, and seed. Remove weeds before seeding, or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist condition.

F. Water newly planted lawn areas and keep moist until new grass is established.

3.4 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain trees, shrubs, and other plants until final acceptance, but in no case, less than 30 days after substantial completion of planting.

C. Maintain landscape not less than 60 days after substantial completion. If seeded in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following spring for additional 30 days. Maintain sodded lawns, not less than 30 days after substantial completion.

D. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regarding and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

E. Water grass as necessary to maintain healthy plants. All areas not maintained properly must be replaced by contractor. All watering should be done in the afternoon or at night. The surface layer of soil must be kept damp by frequent light watering with a fine spray during the germination period after seeding or vegetative planting and until the young plants are rooted firmly.

3.5 CLEAN AND PROTECTION

A. During landscape work, keep pavements clean and work area in an orderly condition.

B. Protect landscape work and materials from damage due to landscape trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

C. Upon completion of all construction, this subcontractor shall clean up any debris, stones, etc., from planted and paved areas, in a neat and acceptable condition meeting the approval of the Architect.

END OF SECTION 32 9000

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