PROJECT #22.22.2

HGE ARCHITECTS INC

333 S. 4TH STREET
COOS BAY, OR 97420
P: 541.269.1166
general@hge1.com
www.hge1.com

PROJECT MANUAL

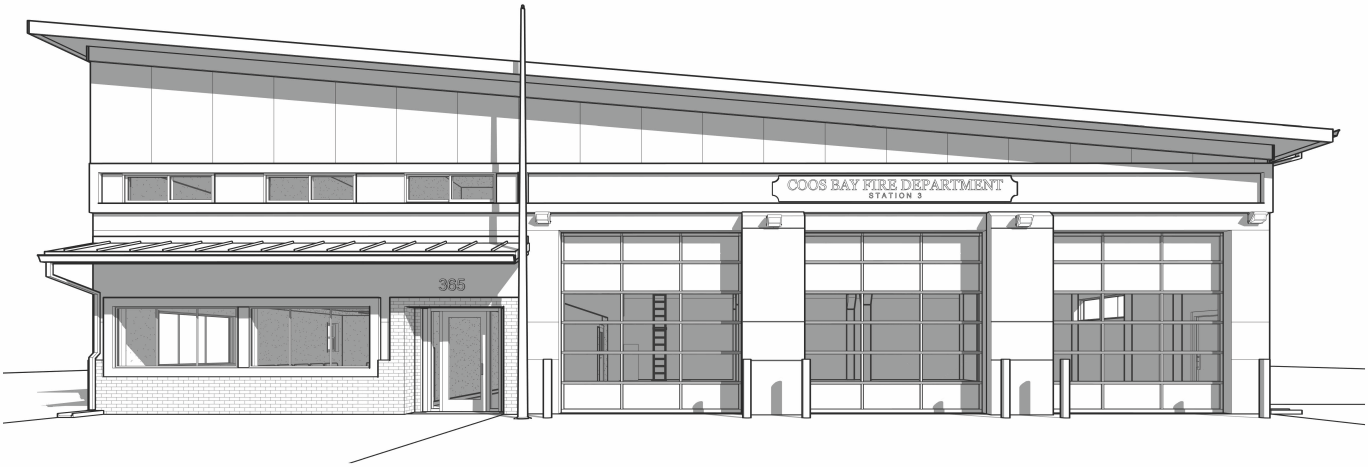
FOR

EASTSIDE FIRE STATION SEISMIC GRANT UPGRADE

FOR

CITY OF COOS BAY

REGISTERED ARCHITECT
2840
JOSEPH A. SLACK
COOS BAY, OREGON
STATE OF OREGON



MAY 2025

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SECTION 00-0101
PROJECT TITLE PAGE

PROJECT MANUAL

FOR

EASTSIDE FIRE STATION

SEISMIC GRANT UPGRADE

365 D STREET, COOS BAY, OREGON

FOR

CITY OF COOS BAY

COOS BAY, OREGON

MAY 2025

PROJECT #22.22.2

HGE ARCHITECTS, INC.

333 SOUTH 4TH STREET

COOS BAY, OREGON 97420

(541) 269-1166

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SECTION 00-0110
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PROCUREMENT AND CONTRACTING REQUIREMENTS

1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

SPECIFICATIONS

2.01 DIVISION 01 -- GENERAL REQUIREMENTS

END OF SECTION

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SECTION 00-1113
ADVERTISEMENT FOR BIDS

Notice is hereby given that sealed bids for the **Eastside Fire Station Seismic Grant Upgrade** project will be received from qualified bidders no later than the bid closing time of **2:00 P.M. Pacific Time, Tuesday, June 24, 2025.** Bids shall be submitted to the Architect electronically: general@hge1.com; or mail/hand delivery: HGE ARCHITECT'S, INC., 333 S. 4th Street, Coos Bay, OR 97420; phone: 541-269-1166. Bids shall be identified as: BID for Eastside Fire Station Seismic Grant Upgrade.

Bids will be publicly opened and read aloud following the bid closing time at 2:15 P.M. via remote phone-in conference call. Join using the following link: https://meet.goto.com/841942853; or dial in using your phone: +1 224-501-3412; Access Code: 841-942-853.

A **Mandatory pre-bid meeting and walk-through will be held at the job site, 365 D Street, Coos Bay, on Tuesday, June 10, at 1:30 p.m.** General Contractors are required to attend to be considered as qualified bidders. Subcontractors and suppliers are encouraged to attend.

Work for this project consists of Seismic Upgrades to the existing Eastside Fire Station building. Base bid work includes all work related to the seismic upgrade: removal of existing unreinforced masonry, concrete grade beams, micropiles, concrete shear walls, reinforcing existing diaphragms and openings, square tube steel, replacing the electrical service, reroofing over the existing building with standing seam metal roofing, insulation, gypsum board, flooring, painting, openings, and other finish work related to the structural upgrades. Alternate bid work includes Apparatus Bay lighting replacement and emergency generator.

Contract Documents for this work may be examined at the Office of HGE ARCHITECT'S, INC. at the above address, at the City of Coos Bay City Hall, various Plan Centers, and on the HGE website at http://www.hge1.com/bidding-area/. General Contractors are encouraged to contact the Architect and register their interest in submitting a bid and to be included on the plan holders' list. One set of large format drawings, specifications and contract documents may be obtained from the Architect, upon refundable deposit of $100.

The Owner reserves the right to reject any and all bids, and to waive any technicalities or informalities in connection therewith. No Bidder may withdraw their bid after the hour set for the opening thereof until the lapse of thirty (30) days from the bid opening.

By: Jeff Adkins, Fire Chief, Coos Bay Fire Department

PUBLISHED:

The World	*Daily Journal of Commerce*
Coos Bay, Oregon	Portland, Oregon
May 27, 2025	May 28, 2025

END OF SECTION

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SECTION 00-2113
INSTRUCTIONS TO BIDDERS

SUMMARY

1.01 SEE AIA A701, (2018 EDITION), INSTRUCTIONS TO BIDDERS FOLLOWING THIS DOCUMENT.

1.02 RELATED DOCUMENTS

A. Document 00-1113 - Advertisement for Bids.

B. AIA Document A701 - 2018 Instructions to Bidders

C. Document 00-2210 - Supplementary Instructions to Bidders

D. Document 00-4100 - Bid Form.

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AIA® Document A701® – 2018

Instructions to Bidders

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

22.22.2 Eastside Fire Station Seismic Grant Upgrade

Work for this project consists of Seismic Upgrades to the existing Eastside Fire Station building. Base bid work includes all work related to the seismic upgrade: removal of existing unreinforced masonry, concrete grade beams, micropiles, concrete shear walls, reinforcing existing diaphragms and openings, square tube steel, replacing the electrical service, reroofing over the existing building with standing seam metal roofing, insulation, gypsum board, flooring, painting, openings, and other finish work related to the structural upgrades. Alternate bid work includes emergency generator.

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

City of Coos Bay
500 Central Avenue
Coos Bay, Oregon 97420
Telephone Number: 541.269.8912

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

HGE ARCHITECTS, Inc.
333 South 4th Street
Coos Bay, OR 97420
Telephone Number: 541.269.1166
Fax Number: 541.269.1833

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.

TABLE OF ARTICLES

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.)

Refer to Section 00-1113 Advertisement for Bids.

§ 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.)

Refer to Section 00-2210 Supplementary Instructions to Bidders.

§ 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.

§ 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 issued via email to all those listed on the Planholders List.

§ 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.)

Refer to Section 00-2210 Supplementary Instructions to Bidders.

§ 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 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 30 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.)

Refer to Section 00-1113 Advertisement for Bids.

§ 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.)

Bid security shall be retained until the Owner has awarded the contract or rejected all bids.

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.

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.)

§ 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 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.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.)

.4 Building Information Modeling Exhibit, if completed:

.5 Drawings
See Eastside Fire Station Seismic Upgrade Drawings dated May 2025 for complete Sheet Index.
(Table deleted)

.6 Specifications

See Eastside Fire Station Seismic Upgrade Project Manual dated May 2025 Section 00-0110 Table of Contents for complete list of Specifications.

(Table deleted)

.7 Addenda:

Number	Date	Pages

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

[**NA**] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

[**NA**] The Sustainability Plan:

Title	Date	Pages

[**X**] Supplementary and other Conditions of the Contract:
Refer to Section 00-7300 Supplementary Conditions.

Document	Title	Date	Pages

.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

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SECTION 00-2210
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

GENERAL

1.01 THE FOLLOWING SUPPLEMENTS SHALL MODIFY, CHANGE, DELETE FROM OR ADD TO THE AIA DOCUMENT A701-2018 INSTRUCTIONS TO BIDDERS. WHERE ANY ARTICLE OF THE INSTRUCTIONS TO BIDDERS IS MODIFIED OR ANY PARAGRAPH, SUBPARAGRAPH, OR CLAUSE THEREOF IS MODIFIED OR DELETED BY THESE SUPPLEMENTS, THE UNALTERED PROVISIONS OF THAT ARTICLE, PARAGRAPH, SUBPARAGRAPH, OR CLAUSE SHALL REMAIN IN EFFECT.

1.02 ARTICLE 1 DEFINITIONS, ADD THE FOLLOWING:

A. The word Owner is City of Coos Bay

B. The word Architect is HGE ARCHITECTS, Inc.

1.03 ARTICLE 2 BIDDERS REPRESENTATIONS, ADD THE FOLLOWING:

A. If a pre-bid walkthrough is held, contractors and sub-contractor attendees are encouraged to familiarize themselves with the bidding and contract documents prior to the walkthrough.

1.04 ARTICLE 3 BIDDING DOCUMENTS, ADD THE FOLLOWING:

A. Bid documents may be obtained at the office of the Architect which is located at 333 South 4th Street, Coos Bay, OR 97420. Phone: 541-269-1166, Email: general@hge1.com, Website: www.hge1.com.

B. One (1) set of Bid Documents can be obtained by prime bidders from HGE Architect, INC., upon refundable deposit of amount indicated on the advertisement for bids.

C. Deposit will be refunded if Bid Documents are returned complete, undamaged, unmarked, and reusable no later than 7 days after bid opening date. Non-bidders' deposit will be refunded if documents are returned in good condition no later than bid opening date. Failure to comply will result in forfeiture of deposit.

D. Bid Documents maybe viewed at the Architect's office, at the office of City of Coos Bay, and various plan centers. PDF digital copies of these documents are also available to Bidders via HGE's website.

E. General Contractors are encouraged to contact HGE's office by phone or email to register their interest in submitting a bid and to be included on the architect's plan holders lists. Addenda and other critical information will be forwarded to all persons on the architect's plan holders list.

F. Upon receipt of Bid Documents , verify that documents are complete. Notify Architect should the document be incomplete.

G. Immediately notify Architect upon finding discrepancies or omissions in the bid documents.

H. Direct questions to Architect, telephone (541)269-1166, email general@hge1.com.

I. Addenda may be issued during the bidding period. All Addenda become part of Contract Documents. Include resultant costs in the Bid Amount. Addenda will be prepared and distributed by the Architect.

J. Addenda will be sent to all plan holders on the Architect's plan holders list via email. A Bidder's failure to request to be included on the plan holders list or accurately submit a proper email address, or Architect not obtaining a proper email address, will not excues the Bidder from obtaining any and all addenda.
   1. Verbal answers are not binding on any party.
   2. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. If clarification or change in the documents is required, the reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

1.05 ARTICLE 4 BIDDING PROCEDURE, ADD THE FOLLOWING:

A. One copy of the Bid Form and other required bidding documents shall be submitted with all blank spaces in the form fully filled.

B. PREPARATION OF FIRST-TIER SUBCONTRACTOR DISCLOSURE
   1. Per ORS 279C.370 the Bidder shall submit First-Tier Subcontractor Disclosure Form not later than 2 hours following the Bid Closing, or the bid will be rejected.
   2. To determine disclosure requirements, the Agency recommends that you disclose subcontract information for any subcontractor and supplier as follows:
      a. Determine the lowest possible contract price. That price will be the base bid amount less all alternate deductive bid amounts (exclusive of any options that can only be exercised after contract award).
      b. Provide the required disclosure information for any first-tier subcontractor whose potential contract services (i.e., subcontractor's base bid amount plus all alternate additive bid amounts, exclusive of any options that can only be exercised after contract award) are greater than or equal to: (i) 5% of that lowest contract price, but at least $15,000, or (ii) $350,000 regardless of the percentage. Total all possible work for each subcontractor in making this determination (e.g., if a subcontractor will provide $15,000 worth of services on the base bid and $40,000 on an additive alternate, then the potential amount of subcontractor's services is $55,000. Assuming that $55,000 exceeds 5% of the lowest contract price, provide the disclosure for both the $15,000 services and the $40,000 services).
      c. Submission. A Bidder shall submit the disclosure form required by this rule within two (2) working hours of Bid Closing in the manner specified by the ITB.
      d. Responsiveness. Compliance with the disclosure and submittal requirements of ORS 279C.370 and this rule is a matter of Responsiveness. Bids which are submitted by Bid Closing, but for which the separate disclosure submittal has not been made by the specified deadline, are not Responsive and shall not be considered for Contract award.
      e. Substitution. Substitution of affected first-tier subcontractors shall be made only in accordance with ORS 279C.585. Agencies do not have a statutory role or duty to review, approve, or resolve disputes concerning such substitutions. However, Agencies are not precluded from making related inquiries or investigating complaints in order to enforce Contract provisions that require compliance generally with laws, rules and regulations.
      f. Effective Date. This rule shall apply to Public Improvement Contract first advertised on or after August 1, 2003. The above instructions have been amended to include modifications approved by the 2005 legislature.
      g. Article 4 Bidding Procedure Subparagraph 4.2.2, add the following:

C. Bid security shall be required in the form of Bid Bond issued by a Bonding Company acceptable to the Owner, cashier's check, or certified check in an amount equal to 10% of the total bid, made payable to the Owner.

D. Bidders shall make arrangements to visit the site prior to bidding. A bidders' conference will be held, as noted in the Advertisement for Bids.

E. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients

F. Oral statements made by the Owner or its representatives at Pro-bid site visits are not binding unless confirmed in writted addendum. (OAR 137-049-0200(1)(a)(B)(iii))

G. All Bidders will leave their bids open for a period of thirty (30) days after the date of bid opening. No bid may be withdrawn during such period of time. Owner may accept any Bid in accordance with the Instructions to Bidders within such thirty (30) day period.

H. Bids signed and under seal, executed, and dated, will be recieved at the designated office before the stated bid closing time. Refer to the Advertisement for Bids for specific bidding information and requirements.
   1. Mailed, hand delivered, and emailed electronic bids shall be received prior to bid closing time.

I. Bids submitted after the stated bid closing time shall be returned to the bidder unopened.

J. Amendments to the submitted offer must be received in writing prior to bid closing and encorsed by the same party or parties who signed and sealed the offer.

1.06 ARTICLE 5 CONSIDERATION OF BIDS, ADD THE FOLLOWING:

A. If the Contractor is to be awarded, Owner will provide written Notice of Intent to Award to all Bidders of the Owner's intent to award the Contract. Owner's award shall not be final until the later of the following:
   1. Five (5) days after the date of the Notice of Intent; or
   2. The Owner provides a written response to all timely-filed protests that denies the protest and affirms the award.

B. Owner reserves the right to accept or reject any or all offers and to waive any technicalities or informalities in connection therewithin.

C. Owner may reject any bid that does not comply with prescribed public contracting procedures and requirements, including the bidder's responsibility under ORS 279C.375(3)(b).

D. No offer will be received or considered unles the offer states that the offeror agrees to be bound by and will comply with the provisions of 279C.838, 279C.840, or U.S.C 3141 to 3148. (OAR 137-049-0200(1)(a)(J))

E. No offer will be considered unless the offeror is registered and in good standing with the Construction Contractors Board. (OAR 137-049-0200(1)(a)(K)

F. Owner may reject for good cause all bids upon finding that it is in the public interest to do so.

G. After acceptance by Owner, the Architect, on behalf of Owner, will issue to the successful bidder a written letter of Contract Award.

H. Goods or services manufactured or produced in the State of Oregon to receive preference, all factors being equal.

1.07 ARTICLE 6 POST BID INFORMATION, AMEND TO READ:

A. Bidders Qualifications
   1. Successful bidder must be registered with the Construction Contractor's Board as required by ORS 701.035 to 701.055.
   2. Successful bidder must demonstrate the bidder's responsibility under ORS 279C.375(3)(b).
   3. Bidder is not required to be licensed for asbestos abatement under ORS 468A.720.

1.08 ARTICLE 7 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND, ADD THE FOLLOWING:

A. A Performance Bond and Labor and Material Payment Bond shall be required. Contractor shall provide separate Performance Bond and Labor and Material Payment Bond made payable to the Owner issued by a Corporation legally licensed to transact business in the State of Oregon. Corporation issuing such a bond must comply with applicable Oregon Statutes for public work and be satisfactory to the Owner. The bonds are to be in the amount of 100% of the contract sum to assure the Owner of full and prompt performance of the Contract.

1.09 ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, ADD THE FOLLOWING:

A. The Contractor shall within ten (10) days after notification in writing of the Owner's Notice to award a Contract, execute and return to the Owner the Form of Agreement, the Bonds and all applicable Certificates of Insurance.

END OF SECTION

HGE ARCHITECTS
333 S. 4TH STREET
COOS BAY, OREGON 97420
P: 541.269.1166
www.hge1.com

SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with AIA Form 701-2018 Instructions to Bidders, Paragraph 3.3 Substitutions.
☐ Substitution approved as noted - Make submittals in accordance with AIA Form 701-2018 Instructions to Bidders, Paragraph 3.3 Substitutions.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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SECTION 00-4100
BID FORM

THE PROJECT AND THE PARTIES

1.01 TO:

A. Owner: **CITY OF COOS BAY**

1.02 FOR: EASTSIDE FIRE STATION SEISMIC UPGRADE PROJECT

A. Project Location: 365 D Street, Coos Bay, Oregon 97420

1.03 DATE: _____ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY:

NAME OF FIRM *(PLEASE PRINT)*: _____

1.05 GENERAL

A. The Bidder declares that they have carefully examined the Contract Documents for the construction of the proposed improvements; that the Bidder has personally inspected the contemplated construction area, that the Bidder has satisfied themselves as to the quantities of materials, items of equipment, possible difficulties, and conditions of work involved.

B. By signing this Proposal, the Bidder certifies that the provisions required by ORS 279C.800 to 279C.870 relating to prevailing wage rates shall be included in this Contract, are understood by the Bidder, and will be complied with during the Work.

C. The bidder further declares that they are registered with the Construction Contractor's Board as required by ORS 701.35 to 701.55, and possess such additional licenses and certifications as required by law for the performance of the work proposed herein.

D. The subcontractor(s) performing work as described in ORS 701.005(2) will be registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractor(s) commence work under the Contract.

E. Pursuant to ORS 279A.120, Bidder hereby certifies the Bidder _____is / _____is not (**check one**) a Resident Bidder as defined by ORS 279.029.

F. Bidder certifies that the provisions required by ORS 279C.836, unless exempt under Sections (4), (7), (8), or (9), before starting work on this Contract, or any subcontract hereunder, Contractor and all subcontractors shall have on lfile with the Construction Contractor's Board a public works bond with corporate surety authorized to do business in the State of Oregon in the amount of $30,000.

G. The Bidder agrees that if this Proposal is accepted, the Bidder will, within ten (10) calendar days after receiving contract forms, execute the Agreement between Owner and Contractor as specified, and deliver to the Owner the Performance and Labor and Payment Bonds required herein.

1.06 BIDS:

A. The undersigned bidder, in submitting his bid, authorizes the Owner to evaluate the bid and make a single award on the basis of the bid.

B. After having examined all of the contract documents as prepared by HGE ARCHITECTS, Inc., we do hereby propose to furnish labor and materials to complete the work required by said documents for the following fixed sum *(fill in lump sum amount for each bid unit, in written words in space provided, and in numerals within parenthesis)*:

BASIC BID: Eastside Fire Station Seismic Upgrade as described in the Construction Documents.

_____Dollars

and _____ Cents ($_____) complete.

ALTERNATE BID 1 - Emergency Generator.

ADD TO BASIC BID:

_____DOLLARS

AND _____ CENTS ($_____) COMPLETE.

Bidder further agrees to be bound by the entire Contract Documents, including:

Advertisment for Bids
Issued Addenda
Instructions to Bidders - AIA A701 and Supplemental Instructions
Bid Form (this document)
Subcontractor Disclosure Form
General Conditions - AIA 201 and Supplementary Conditions
Contract for Construction: Owner-Contractor Agreement - AIA 101
Performance and Payment Bonds
Technical Specifications
Plans/Drawings
Issued Change Orders and Architects Supplemental Instructions
All Applicable State and Federal Laws

1.07 BID SECURITY

A. Bid security in the form of a certified check of Bid Bond in the amount of 10% of the bid amount is enclosed per ORS 279C.385. The undersigned agrees that Bid Security will be left in escrow with the Owner and that the amount thereof is the measure of liquidated damages which Owner will sustain by failure of the undersigned to deliver and execute the Contract or provide Performance and Payment Bonds and may become the property of the Owner at Owner's option. If this bid is not accepted within thirty (30) days of the time set for the opening of bids or if the undersigned executes and timely delivers said contract and the Performance and Payment Bonds, the Bid Security will be returned.

1.08 COMPLETION DATE

A. It is understood that time is of the essence in the execution of this Contract in order to avoid undue hardship upon the Owner. It is the desire of the Owner to have the project completed within **Two Hundred Forty (240)** calendar days following Notice to Proceed.

B. The Undersigned agrees that he will have the work Substantially Complete on or before _____ calendar days after Notice to Proceed *(Bidder to fill in the number of days they will require to complete the Work and this will be the agreed upon construction time period).*

C. The Contractor agrees that said Work shall be prosecuted regularly, diligently, at such rate of progress as will insure Substantial Completion thereof within the time specified. It is expressly understood and agreed, by the Contractor and the Owner, that the time for the completion of the Work described herein is reasonable taking into consideration the average climatic range and ususal industrial conditions prevailing in this locality.

1.09 OWNER RIGHTS

A. The Owner reserves the right to reject any or all bids and to waive all informalities.

1.10 ADDENDA

A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
   1. Addendum # _____ Dated _____.
   2. Addendum # _____ Dated _____.
   3. Addendum # _____ Dated _____.
   4. Addendum # _____ Dated _____.

1.11 BID FORM SIGNATURE(S)

A. Name of Firm *(please print):*_____

B. Mailing Address:_____

C. Physical Address *(if different):*_____

D. Construction Contractor Board Registration Number:_____

E. Telephone Number:_____

F. Fax Number:_____

G. Email Address:_____

H. Signature *(if bid is by a partnership, one of the partners must sign):*

_____

I. Name and Official Capacity of Signatory *(please print):*

_____

J. If Corporation, Attest *(Secretary of Corporation):*

_____

K. SEAL (if Corporation):

END OF SECTION

FIRST-TIER SUBCONTRACTOR DISCLOSURE

PROJECT NAME:_____

BID #:_____

BID CLOSING: Date: _____Time:_____

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor and materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED.)

NAME	DOLLAR VALUE	CATEGORY OF WORK
(1)	$	
(2)	$	
(3)	$	
(4)	$	
(5)	$	
(6)	$	
(7)	$	
(8)	$	
(9)	$	

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award.

Form submitted by (bidder name): _____

Contact name: _____ Phone no.: ( ) _____

ORS 279C.370 First-tier subcontractor disclosure. (1)(a) Within two working hours after the date and time of the deadline when bids are due to a contracting agency for a public improvement contract, a bidder shall submit to the contracting agency a disclosure of the first-tier subcontractors that:

(A) Will be furnishing labor or will be furnishing labor and materials in connection with the public improvement contract; and

(B) Will have a contract value that is equal to or greater than five percent of the total project bid or $15,000, whichever is greater, or $350,000 regardless of the percentage of the total project bid.

(b) For each contract to which this subsection applies, the contracting agency shall designate a deadline for submission of bids that has a date on a Tuesday, Wednesday or Thursday and a time between 2 p.m. and 5 p.m., except that this paragraph does not apply to public contracts for maintenance or construction of highways, bridges or other transportation facilities.

(c) This subsection applies only to public improvement contracts **("projects")** with a value, estimated by the contracting agency, of more than **$100,000**.

(d) This subsection does not apply to public improvement contracts that have been exempted from competitive bidding requirements under ORS 279C.335 (2).

(2) The disclosure of first-tier subcontractors under subsection (1) of this section must include the name of each subcontractor, the category of work that each subcontractor will perform and the dollar value of each subcontract. The information shall be disclosed in substantially the following [above] form:

(3) A contracting agency shall accept the subcontractor disclosure. The contracting agency shall consider the bid of any contractor that does not submit a subcontractor disclosure to the contracting agency to be a non-responsive bid and may not award the contract to the contractor. A contracting agency is not required to determine the accuracy or the completeness of the subcontractor disclosure.

(4) After the bids are opened, the subcontractor disclosures must be made available for public inspection.

(5) A contractor may substitute a first-tier subcontractor under the provisions of ORS 279C.585.

(6) A subcontractor may file a complaint under ORS 279C.590 based on the disclosure requirements of subsection (1) of this section.

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SECTION 00-5200
AGREEMENT FORM

PART 1 GENERAL

1.01 THE DRAFT OF AIA 101 - 2017 - AGREEMENT TO BE EXECUTED IS ATTACHED FOLLOWING THIS PAGE.

1.02 RELATED REQUIREMENTS

A. Section 00-7200 - General Conditions.

B. Section 00-7300 - Supplementary Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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DRAFT AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«City of Coos Bay»«»
«500 Central Avenue
Coos Bay, Oregon 97420»
«Telephone Number: 541.269.8912»
«»

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

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

«22.22.2 Eastside Fire Station Seismic Grant Upgrade»
« »
«Work for this project consists of Seismic Upgrades to the existing Eastside Fire Station building. Base bid work includes all work related to the seismic upgrade: removal of existing unreinforced masonry, concrete grade beams, micropiles, concrete shear walls, reinforcing existing diaphragms and openings, square tube steel, replacing the electrical service, reroofing over the existing building with standing seam metal roofing, insulation, gypsum board, flooring, lighting, painting, openings, and other finish work related to the structural upgrades. Alternate bid work includes emergency generator.»

The Architect:
(Name, legal status, address and other information)

«HGE ARCHITECTS, Inc.»«»
«333 South 4th Street
Coos Bay, OR 97420»
«Telephone Number: 541.269.1166»
«Fax Number: 541.269.1833»

The Owner and Contractor agree as follows.

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.

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[« »] The date of this Agreement.

[« »] A date set forth in a notice to proceed issued by the Owner.

[« »] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »

« »

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[« »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

«Nichole Rutherford»
«500 Central Avenue
Coos Bay, Oregon 97420»
«Telephone Number: 541.269.1812»
«»
«»
«Email Address: nrutherrford@coosbayOR.gov»

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)

« »

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

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

[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:

(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
«Nichole Rutherford»«, City Manager»	« »« »
(Printed name and title)	*(Printed name and title)*

SECTION 00-7200
GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE:

A. AIA Document A201-2017, General Conditions of the Contract for Constuction.

RELATED REQUIREMENTS

2.01 SECTION 00-7300 - SUPPLEMENTARY CONDITIONS.

SUPPLEMENTARY CONDITIONS

3.01 REFER TO DOCUMENT 00-7300 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

END OF SECTION

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AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

22.22.2 Eastside Fire Station Seismic Grant Upgrade

THE OWNER:
(Name, legal status and address)

City of Coos Bay
500 Central Avenue
Coos Bay, Oregon 97420

THE ARCHITECT:
(Name, legal status and address)

HGE ARCHITECTS, Inc.
333 South 4th Street
Coos Bay, OR 97420

TABLE OF ARTICLES

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.

INDEX

(Topics and numbers in bold are Section headings.)

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 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 written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 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 written protocols governing the use of, and reliance on, the information contained in the model 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, 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.

§ 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.

§ 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.

§ 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 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.

§ 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.

§ 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 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 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, 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, 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:

.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 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 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.

§ 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.

§ 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.

§ 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.

§ 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.

§ 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.

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.

§ 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 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.

§ 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.

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, 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.

§ 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 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.

§ 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.

SECTION 00-7300
SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

A. These Supplementary Conditions amend and supplement the General Conditions, AIA Document A201-2017 General Conditions of the Contract for Construction defined in Document 00 7200 and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.02 MODIFICATIONS TO GENERAL CONDITIONS

A. ARTICLE 1. GENERAL PROVISIONS
1. 1.1.1: Revise the first sentence as set forth below:
   a. The Contract Documents consist of the Conditions of the Contract (General, Supplementary and other Conditions), Contract Forms as bound or referenced, the Drawings, the Specifications, the Details, all Addenda issued prior to execution of the contract and all modifications issued after execution of the Contract.
2. 1.2 CORRELATIONS AND INTENT OF THE CONTRACT DOCUMENTS
   a. 1.2.1 Add the following:
      1) If work is required in a manner to make it impossible to produce first class work, or should discrepancies appear among contract documents, request interpretation before proceeding with work. If Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner.
   b. 1.2.3: Add the following:
      1) Reference to technical society, organization, or body is made in specifications in accordance with the following abbreviations:
         a) ACI American Concrete Institute
         b) AIA American Institute of Architects
         c) AIEE American Institute of Electrical Engineers
         d) AISC American Institute of Steel Construction
         e) ASA American Standard Association
         f) APA American Plywood Association
         g) ASTM American Society of Testing Materials
         h) ASME American Society of Mechanical Engineers
         i) AWI Architectural Woodwork Institute
         j) AWSC American Welding Society Code
         k) CS Commercial Standard
         l) FS Federal Specifications
         m) IBC International Building Code
         n) MIL Military Specifications
         o) NBFU National Board of Fire Underwriters
         p) NBS National Board of Standards
         q) NEC National Electric Code
         r) NEMA National Electrical Manufacturer's Assn.
         s) NFPA National Fire Protection Association

t) OSHA Occupational Safety and Health Act
u) UBC Uniform Building Code
v) UL Underwriters Laboratory
w) WCLIB West Coast Lumber Inspection Bureau

B. ARTICLE 2 OWNER
1. 2.1.1 Add the following:
a. The Owner is defined as City of Coos Bay.
2. 2.3.6 Substitute the following:
a. The Owner through the Architect will furnish to the Contractor (Four (4)) complete sets of drawings and specifications without charge for use on project. These include sets submitted to Agency having jurisdiction for plans review and building permit. Additional copies may be purchased by Contractor at cost of reproduction.

C. ARTICLE 3 CONTRACTOR
1. 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES
a. 3.3.1 Add the following:
1) The Contractor will supervise and direct the work and will review with all subcontractors methods and materials to be used to verify their compliance with all safety standards and laws and be responsible for compliance with same, to insure safe, hazard free conditions for all persons visiting or working on the entire project.
2. 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS
a. 3.7.1 Add:
1) The Owner shall pay for the Building Permit Plan Review and Building Permit fees only. The Contractor shall pay all other permit and plan review fees related to his work and his subcontractors, i.e., plumbing, mechanical and electrical. Owner shall pay any system development fees required.
3. 3.11 DOCUMENTS AND SAMPLES AT THE SITE, Add the following:
a. Upon completion of the project transfer all information from the record set of drawings to a clean set of prints and deliver to the Architect. Drawing additions are to be added in contrasting ink and are to be accurate, neat and finished in appearance and show accurate horizontal and vertical dimensions for location of underground work. Drawings must be acceptable to Architect before certification of final payment will be made.
4. 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
a. 3.12.5 Add the following:
1) See Section 01-3000 - Administrative Requirements for submittal information, requirements, and procedures.
5. 3.15 CLEANING UP
a. 3.15.1 Add the following:
1) Upon completion of any portion of the work, promptly remove temporary facilities generated by that portion of the work, including surplus materials, equipment, and machinery if so directed by the Architect or the Owner. Upon completion of the Work, completely remove temporary facilities. Remove stains, spots and smears from all surfaces. Remove all labels. Leave the premises in a "broom clean" condition.

D. ARTICLE 4 ARCHITECT
1. 4.1.1 Add the following:
a. The Architect is defined as HGE Architects, Inc.

E. ARTICLE 5 SUBCONTRACTORS
1. 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

a. 5.2.1 Add the following:
1) The list of subcontractors shall be submitted no later than five (5) days after the bid opening.

F. ARTICLE 7 CHANGES IN THE WORK
1. 7.2 CHANGE ORDERS
a. 7.2.2 Add the following:
1) The cost to the Owner resulting from extra work shall be determined by an agreed price which shall include a percentage for overhead and profit as listed below; or shall be the actual cost of the additional direct labor, materials, and subcontract work involved, plus a percentage for overhead and profit as listed below.
a) The percentage shall not exceed 10% to cover both profit and overhead.
2) The credit to the Owner resulting from a deduction of work shall be determined by an agreed price, or the actual cost of direct labor, materials, and subcontract work involved.
3) Cost and credits shall be submitted by the Contractor to the Architect in a complete breakdown form, showing cost, overhead and profit.
4) Cost shall be limited to the following: Cost of products, including taxes and cost of delivery; cost of labor, including social security, old age, and unemployment insurance, and fringe benefits under collective bargaining agreements; Workmen's Compensation Insurance; bond premiums; and rental value of power tools and equipment. Overhead shall include the following: Supervision, superintendence, wages of time keepers, watchmen, and clerks, hand tools, incidentals, general office expense, and all other proven expenses not included in "cost".

G. ARTICLE 8 TIME
1. 8.2 PROGRESS AND COMPLETION
a. 8.2.4 Add the following:
1) The Contractor agrees:
2) To proceed upon receipt of the executed Contract and the Notice to Proceed.
3) It is hereby understood and mutually agreed, by and between the contractor and the Owner, that the date of beginning and the time for completion of each phase of the work to be done are ESSENTIAL CONDITIONS of this contract.
4) The Contractor agrees that said work shall be prosecuted regularly, diligently, at such rate of progress as will insure substantial completion thereof within the time specified. It is expressly understood and agree, by and between the Contractor and the Owner that the time for the completion of the work described herein is reasonable taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

H. ARTICLE 9 PAYMENTS AND COMPLETION
1. APPLICATIONS FOR PAYMENT
a. 9.3.1 Add the following:
1) Payment request form shall be submitted on AIA G702 Application for Payment supplimented with AIA G703 Continuation Sheet. Forms will be furnished by Architect if requested by Contractor. Contractor may use their own spreadsheet type format, however line items must exactly match AIA line items.
2. PROGRESS PAYMENTS

a. 9.6.1 Amend as follows:

1) After the Architect has issued a certificate for payment the Owner will pay the Contractor ninety-five (95%) percent of the value of material and labor worked into the building or stored on the site before the first day of the month less the aggregate of previous payments.

2) Payment will be made on or before the fifteenth (15th) day of the month following the date of the application for payment.

3) Upon Substantial Completion of the contract the sum sufficient to increase total payment to ninety-five (95%) percent of the contract amount is due. Thirty (30) days thereafter, provided the work then be fully completed and accepted by the Architect, balance under the contract is due.

I. ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

1. 10.2 SAFETY OF PERSONS AND PROPERTY

a. 10.2.2 Add the following:

1) Contractors shall comply with all provisions of OAR 437 Division 155 (Hazard Communication). Contractor shall provide Owner, through the Architect, a copy of MSDS (Material Safety Data Sheets) for all chemicals brought onto the site, and shall maintain an inventory on the job site of such chemicals. Such inventory shall be accessible to those who desire access.

J. ARTICLE 11 INSURANCE AND BONDS

1. 11.1 CONTRACTOR'S INSURANCE AND BONDS

a. 11.1.2 Add the following:

1) The Contractor's comprehensive general liability insurance and automobile liability insurance shall not be less than the amount shown below:

2) Worker's Compensation as required by law.

3) Bodily Injury Liability - Automobile:

a) Each person $ 500,000

b) Each occurrence $1,000,000

4) Bodily Injury Liability - Except Automobile

a) Each person $1,000,000

b) Each occurrence $1,000,000

5) Property Damage Liability - Automobile:

a) Each occurrence $ 500,000

6) Property Damage Liability - Except Automobile:

a) Each occurrence $ 500,000

b) Aggregate occurrence $1,000,000

7) The Contractor will either (1) require each of his subcontractors to procure and maintain during the life of his subcontract, subcontractor's comprehensive general liability, automobile liability, and property damage liability insurance of the type and in the same amounts as specified in this subparagraph; or (2) insure the activity of his subcontractors.

8) The Contractor, its subcontractors, if any, and all employers working under this Agreement are subject employers under the Oregon Worker's Compensation Law and shall comply with ORS 656.017, which requires them to provide workers' compensation coverage for all their subject workers.

2. 11.1.2 Substitute the following:

a. The Contractor shall furnish a Performance Bond in an amount equal to one hundred (100%) percent of the contract sum as security for the faithful performance of this contract and also a Labor and Material Payment Bond in an amount not less than one hundred (100%) percent of the contract sum as security for the payment of all persons performing labor on the project under this contract. Bond shall be written by a company licensed in the State of Oregon and satisfactory to the Owner.

3. 11.1.3.1 Add the following:
   a. The Contractor is advised that the Owner does not carry "Builder's Risk" Insurance and the Contractor is required to obtain this insurance.
4. 11.4 PERFORMANCE AND PAYMENT BOND
5. 11.4.1 Substitute the following:
   a. The Contractor shall furnish a Performance Bond in an amount equal to one hundred (100%) percent of the contract sum as security for the faithful performance of this contract and also a Labor and Materials Payment Bond in an amount not less than one hundred (100%) percent of the contract sum as security for the payment of all persons performing labor on the project under this contract. Bond shall be written by a company licensed in the State of Oregon and satisfactory to the Owner.

K. ARTICLE 13 MISCELLANOUS PROVISIONS
1. 13.1 GOVERNING LAW, Add the following:
   a. General Contractor and each subcontractor to comply with all Federal, State laws pertaining to Social Security, Unemployment Insurance, Tax Regulations. Make prompt payment to designated agencies.
   b. Contractor agrees to abide by all Federal and State regulations pertaining to the employment of minority and ethnic groups including all required affirmative action, and further agrees to hold owner harmless on account of all duties and responsibilities imposed on Contractor by the terms of any State or Federal Statute, regulation, or other governmental directive.
2. 13.6 Add the following:
   a. All labor subject to the provisions of ORS 279C.520 and 279C.830 which is performed under this contract shall be paid not less than the prevailing rate of wage for an hour's work in the same trade or occupation in the locality where such labor is performed.

L. ADD ARTICLE 16 SUPPLEMENTAL PUBLIC CONTRACTING STATUTES
1. See document following this Section.
2. Contractor and any Subcontractor shall pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 00-7346
PREVAILING WAGE RATES

PART 1 GENERAL

1.01 REQUIREMENTS:

A. The “Prevailing Wage Rates for Public Works Contracts in Oregon” dated January 5, 2025 including any issued corrections or amendments that follow are herein added to the Contract Documents by reference.

B. BOLI Prevailing Wage Rate information is available upon request, or electronically at www.oregon.gov/boli.

C. Work under this Contract will be subject to the provisions of ORS 279C.800 to 279C.870, relating to BOLI Prevailing Wage Rates in effect at the time the project was advertised for bids.

D. Provisions described in this Section or in Exhibit A of the Public Contracting Code Requirement for Public Improvements Contracts over $50,000, located at the end of the Supplemental General Conditions, will apply regardless of the price of any individual Contract, so long as the combined price of all Contracts award on the project is $50,000 or more.

E. If total Contract amount does not exceed $50,000, Contractor is not required to pay prevailing wage rates.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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GEOTECHNICAL INVESTIGATION REPORT AND SITE SEISMIC HAZARD STUDY

For the:

Eastside Fire Station #3 Improvements
365 D Street
Coos Bay, Coos County, Oregon 97420

Prepared for:

HGE Architects, Inc.
Attention: Joe Slack, Principal Architect
333 South 4th Street
Coos Bay, Oregon 97420

Prepared by:

Earth Engineers
4660 Main Street, Suite 100
Springfield, Oregon 97478
Telephone 541.393.6340

Earth Engineers Report No. 10-242116-001

February 7, 2025

EARTH ENGINEERS
An RMA Company

Prepared by:

Greg Thibeaux, P.E.
Geotechnical Engineer

Reviewed by:

Troy Hull, P.E., G.E.
Principal Geotechnical Engineer

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1.0 PROJECT INFORMATION

1.1 Project Authorization

Earth Engineers has completed a Geotechnical Investigation Report and Seismic Site Hazard Study for the proposed improvements to be constructed at the Eastside Fire Station #3, located on the subject property referenced above (see Figure 1 below). Our services were authorized by Mr. Joe Slack with HGE Architects, Inc., on September 7, 2024 by signing our proposal 10-242116-P, dated September 3, 2024.

1.2 Project Background and Description

Our current understanding of the project is based on the information provided to Greg Thibeaux of our firm from Mr. Slack in emails received in our office between December 29, 2023 and January 4, 2024. In addition, we were provided project information in a phone conversation with project structural engineer Kyle Kraxberger with DCI Structural Engineers on July 29, 2024. The following project drawings for the proposed improvements were received in an email attachment from Dominic Librie with HGE Architects on July 26, 2024:

- **Architectural drawing sheets** A1.1, A2.1 through 2.7, and A4.1 through A4.4, prepared by HGE Architects, Inc., entitled *City of Coos Bay, Eastside Fire Station, Seismic Grant,* dated January 2024.
- **Structural drawings** prepared by DCI Engineers, 3 drawing sheets, B-2, B-3 and B-4, entitled *Coos Bay Fire Department, Eastside Fire Station, First Floor Plan, Second Floor Plan and Roof Plan*, undated.
- **Original building plans** prepared by R.H. Erichsen Consulting Engineer, entitled *City of Eastside, Eastside Oregon, City Hall Construction*, 21 drawing sheets, 1 through 20A, dated December 13, 1956.

Briefly, we understand that improvements to the existing fire station are proposed, which include underpinning portions of the existing foundations using micropiles connected to existing foundation elements with steel plates and post-installed anchorage; and underpinning foundations that are being replaced, using micropiles cast into new foundation elements, as indicated on the structural drawing B-2 in Figure 2 below. In addition, part of the existing concrete slab on grade and apron at the south apparatus bay will be replaced, as indicated on architectural drawing A2.1 (see Figure 3 below).

Figure 1: Site Vicinity Map (source: USGS/USA TOPO Maps).

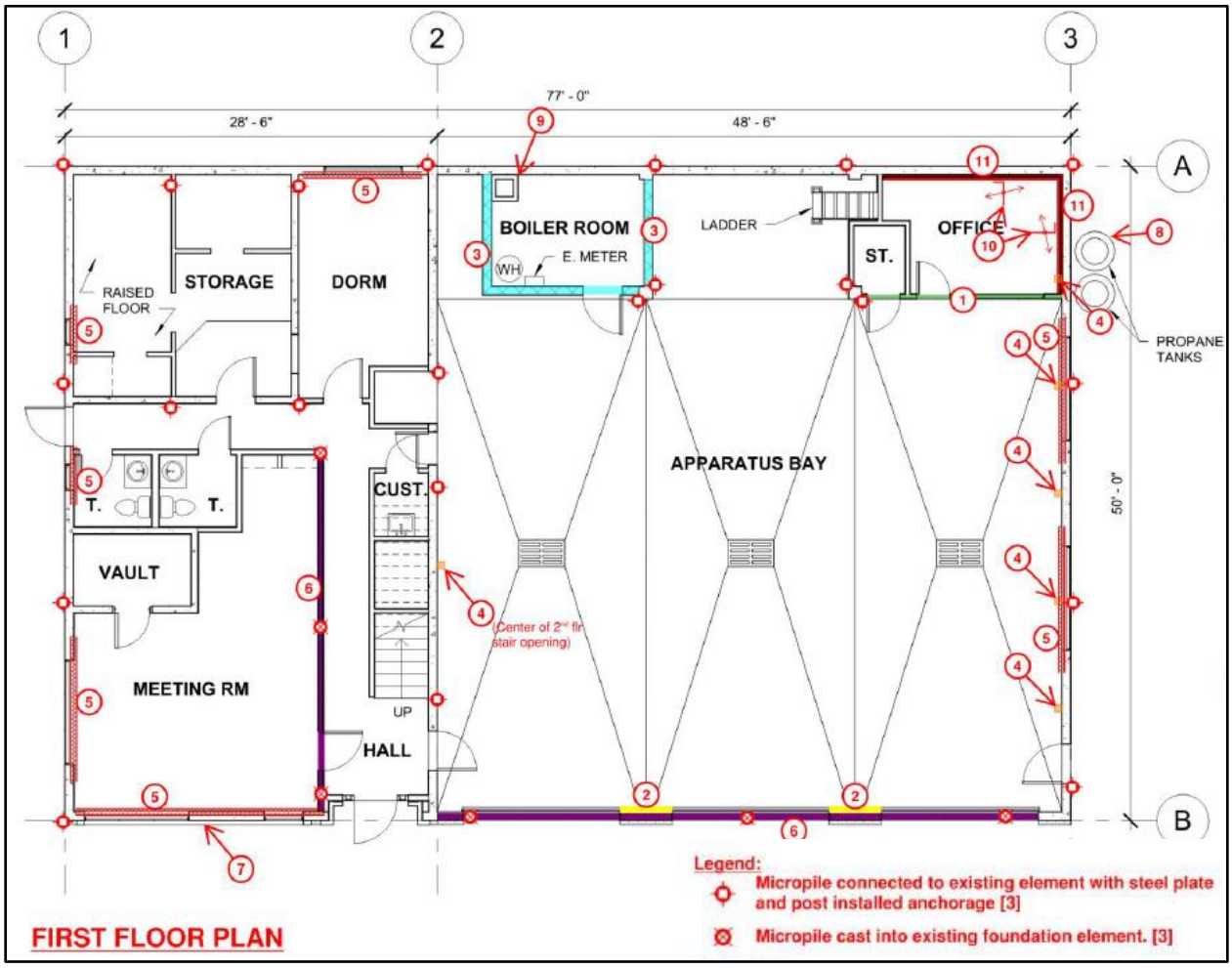

Figure 2: Structural drawing sheet B-2 (base plan referenced above).

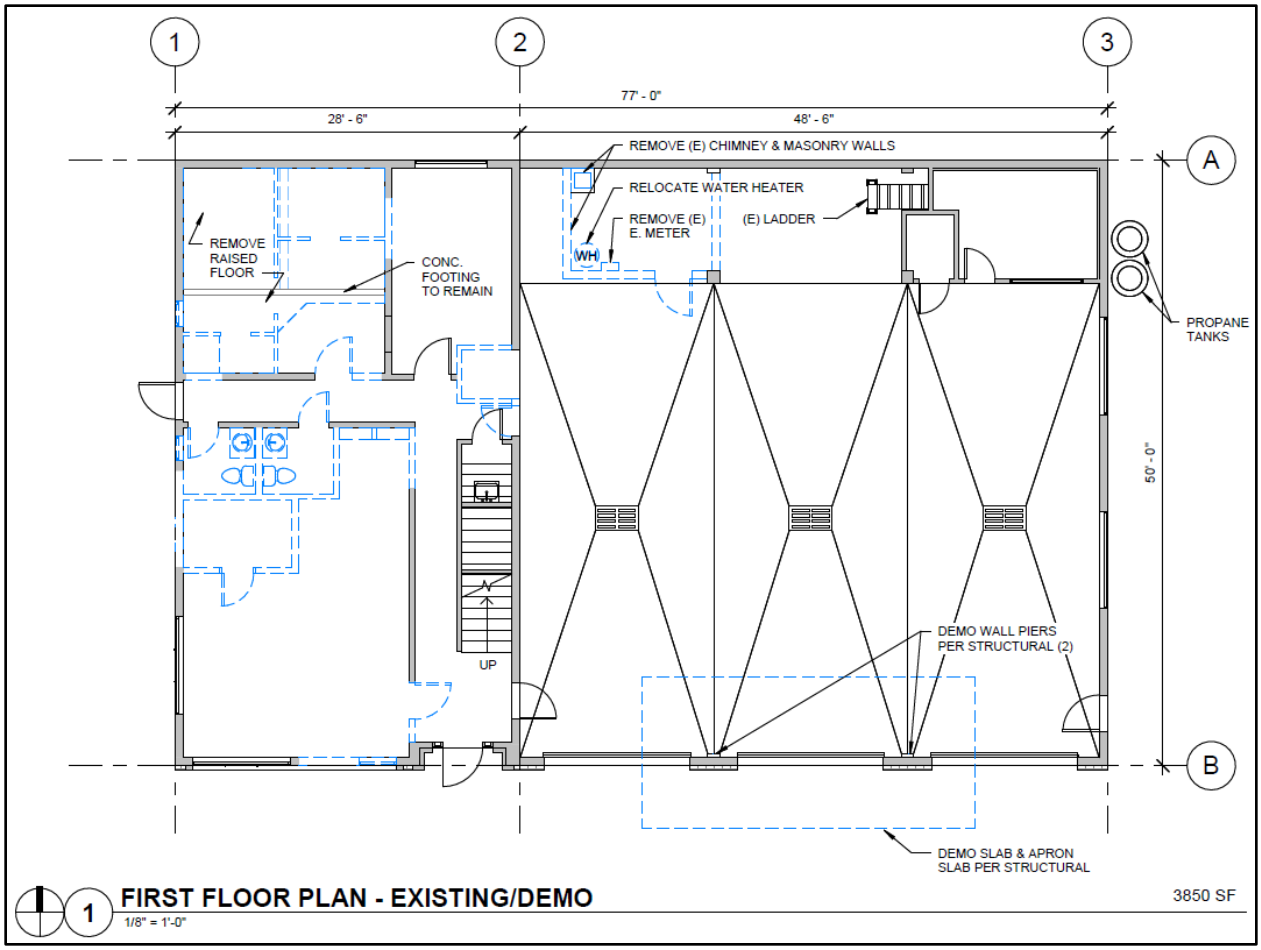

Figure 3: Architectural drawing sheet A2.1 entitled *First Floor Plan – Existing/Demo*, referenced above.

Note that Earth Engineers previously completed a geotechnical visual site reconnaissance on December 27, 2023, and a preliminary report with recommendations addressing the proposed Eastside Fire Station #3 improvements. Our preliminary report was entitled *Preliminary Recommendations Report, Eastside Fire Station #3, 365 D Street, Coos Bay, Coos County, Oregon 97420, EEI Report No. 23-301-1-R1,* dated December 29, 2023. In addition, Earth Engineers completed a geotechnical site investigation and site seismic hazard study report for the adjacent Eastside Elementary school and Millicoma school. Our report was entitled *Revised Geotechnical Investigation and Seismic Site Hazard Report, Proposed Millicoma Intermediate School Improvements and New Eastside Elementary School, 260 2nd Avenue, Coos Bay, Oregon 97420, EEI Report No. 18-139-1-R2,* revision dated January 11, 2019.

The Eastside Fire Station #3 is bordered by Eastside Elementary School to the west, by 4th Avenue to the east, by D Street to the south, and by a paved parking lot and residential developed property to the north. We understand the existing building was constructed in the 1950's and was formerly the site of Eastside City Hall (see Photos 1 and 2 below). On the date of our site investigation, the area around the existing building was covered with either an approximately 6-inch-thick layer of asphalt or reinforced concrete pavement, and is currently relatively flat and level, except for an approximately 20-degree, 6 to 8 foot-tall, down sloping embankment. The embankment is located along the east edge of the site, along 4th Avenue

(see Photo 3 below). Based on elevations interpolated from the latest Google Earth aerial imagery dated April 26, 2023, current site elevations range from about 70 to 79 feet above mean sea level.

Photo 1: Looking north at front of fire station, from D Street.

Photo 2: Looking southwest at back of fire station.

Photo 3: Looking north along sloped ground adjacent to 4th Avenue located on east edge of the site.

No below grade construction or retaining walls are planned to our knowledge. We have assumed the construction will be in accordance with the 2022 Oregon Structural Specialty Code (OSSC), an amendment to the 2018 International Building Code (IBC), and ASCE 7-16. We have assumed slab on grade floor loads will not exceed 250 pounds per cubic foot (psf).

1.3 Purpose and Scope of Services

The purpose of our services was to perform a geotechnical engineering evaluation of the site subsurface conditions and a seismic site hazard study, for the proposed improvements. In order to provide geotechnical engineering recommendations for the project, we performed a subsurface investigation at the site on October 10, and October 11, 2024. The subsurface conditions for the proposed construction were explored with two (2) Standard Penetration Test (SPT) borings, B-1 and B-2. In addition, as part of our site specific seismic hazard study, we performed two (2) Refraction Microtremor (ReMi) testing runs at the site on October 23, 2024. The exploration locations were based on the project information and drawings we were provided, as well as the locations of existing utilities, buildings, and site access conditions.

Select soil samples were tested in the laboratory to determine material properties for our evaluation. The laboratory test results have been included on the Boring Logs in Appendix A.

This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents the following recommendations:

- A discussion of subsurface conditions encountered including pertinent soil and rock properties and groundwater conditions.
- A Seismic Site Hazard Study in accordance with the 2022 Oregon Structural Specialty Code (OSSC), submitted in accordance with section 1803.9, including an analysis using SHAKE and Liquefy Pro computer software.
- ReMi shear wave velocity testing results.
- Qualitative evaluation of site slope stability.
- Imported fill requirements, including gradation and compaction.
- Recommendations for foundation subgrade preparation and the overall suitability of the in-situ soils and in-place materials for use as structural fill.
- Geotechnical related drilled and grouted micropile foundation recommendations including allowable axial capacity, minimum embedment, and estimated settlements.
- Geotechnical related slab on grade support recommendations.
- Geotechnical pavement design recommendations using a conservatively assumed CBR and assumed traffic loading conditions.
- Wet and dry weather construction recommendations.
- Subsurface drainage requirements.
- Groundwater considerations.
- Discussions on geotechnical issues that may impact the project.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Mapped Geology and Soils

The underlying geologic unit is mapped as a tertiary sedimentary rock. The geologic unit, "Tecm", is a middle member of the Coaledo Formation of the upper to middle Eocene (approximately 57 to 36 million years ago). This unit consists of "mudstone, siltstone and minor sandstone and tuff. Members of the Coaledo Formation include plane laminated beds and complete to partial Bouma sequences in sandstone beds".[1] According to opengeology.org (available atthttp://opengeology.org), the Bouma sequence specifically describes the ideal vertical succession of structures deposited by low-density, low-sand concentration, fine-grained turbidity currents (http://opengeology.org).

According to the Web Soil Survey's Soil Map – Lane County Area, Oregon (http://websoilsurvey.Nrcs.usda.gov/app/WebSoilSurvey.aspx), the native soils at the project site consist of Wintley silt loam (soil unit no. 63B) with 0 to 8 percent slopes. According to the soil survey, Wintley silt loam consists of terrace landforms. The parent material is described as mixed alluvium. This soil unit is mapped with no frequency of flooding or ponding, and is typically well drained, with typical depth to a water table and restrictive feature of more than 80 inches. A typical soil profile for Wintley silt loam is, from 0 to 1 inch – slightly decomposed plant material; from 1 to 5 inches – silt loam; from 5 to 48 inches – silty clay loam; and from 48 to 61 inches - very gravelly loam.

2.2 Subsurface Materials

As mentioned above, the subsurface conditions for the proposed construction were explored with two (2) SPT borings, B-1 and B-2 (see Photos 4 and 5 below). The borings were conducted by our drilling subcontractor, Holt Services, Inc. of Vancouver, Washington, using their B-58 truck mounted drill rig, equipped with an energy-calibrated SPT auto-hammer, utilizing mud rotary drilling techniques. The borings were advanced to a depth of approximately 51.5 feet below the ground surface (bgs). The locations of the explorations were constrained due to the presence of the existing structure, and underground and overhead utilities. The approximate locations of the borings are shown on the Boring Location Plan, Figure 4 below. The latitude and longitude coordinates of the explorations were recorded using a hand-held GPS, and the locations were recorded on site using known reference points. The locations were included on the Boring Logs, in Appendix A. The borings were backfilled with bentonite hole plug, and the surface was repaired using non-shrink grout, to approximately existing grade, upon completion on October 10 and October 11, 2024.

Each soil sample collected was marked and identified by date sampled, project name, project number, boring number, and sample depth. The samples were transported to our laboratory for visual identification and laboratory testing. Select soil samples were tested in the laboratory to

1 Gerald L. Black and Ian P. Madin, 1995, Geologic map of the Coos Bay quadrangle, Coos County, Oregon: U.S. Geological Survey, GMS-97, scale 1:24,000.

determine material properties for our evaluation. Samples not altered by laboratory testing will be retained for 90 days from the date of this report.

Select soil samples were tested in the laboratory to determine material properties for our evaluation. Laboratory testing was accomplished in general accordance with ASTM procedures. The testing performed included moisture content tests (ASTM D2216), and the amount of material in the soils finer than the #200 sieve (ASTM D1140). The laboratory test results have been included on the Boring Logs in Appendix A.

The materials encountered in borings B-1 and B-2 may be divided into five (5) general strata, as described below:

Asphalt or Concrete Pavement: The upper layer in both boring locations, B-1 and B-2, was an approximately 6-inch-thick layer of asphalt or concrete pavement.

Undocumented Fill Materials: The layer underlying the pavement in both borings, B-1 and B-2, appeared to be undocumented fill materials. The fill appeared to consist of imported crushed rock in the upper few inches, underlain by mixed, brown, gray and yellow-brown, silty clay. The fill soil was likely placed during construction of the existing building to level the building pad.

Based on visual examination of the soil samples obtained, and the subsurface data, the fill encountered in our explorations appeared to be about 10 feet thick. However, it should be noted that the explorations performed were not adequate to accurately identify the full extent of existing fill across the entire property. Consequently, the actual fill extent may be greater than that shown on the exploration logs and discussed herein. Variations in the presence of fill material should be expected between site locations. The fill is considered undocumented because we have not been provided with any documentation of the fill placement (i.e. fill materials, lift thicknesses and compaction test results).

Sandy Silt/Silt with Sand/Silt (ML): The layers underlying the fill material in both borings B-1 and B-2 classified as a Sandy Silt/Sand with Silt/Silt (ML), in general accordance with the Unified Soil Classification System (USCS). Based on SPT N_{60}-Values ranging from 4 to 106 blows per foot, the silty soil stratum ranged from soft to hard in the exploration locations.

Silty Sand (SM): The layers underlying the silty soils in both borings B-1 and B-2 (except for the terminal layer of silt encountered in both borings) classified as Silty Sand (SM) in general accordance with the USCS. Based on SPT N_{60}-Values ranging from 30 to 122 blows per foot in boring B-1, the sand stratum was dense to very dense in the exploration locations.

Photo 4: Looking west at location of boring B-1.

Photo 5: Looking east at location of boring B-2.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in Appendix A should be reviewed for specific information at specific locations. These records include soil descriptions, stratifications, SPT N_{60}-Values, and locations of the borings and soil samples. The

stratifications shown on the logs represent the conditions only at the actual exploration locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on these logs.

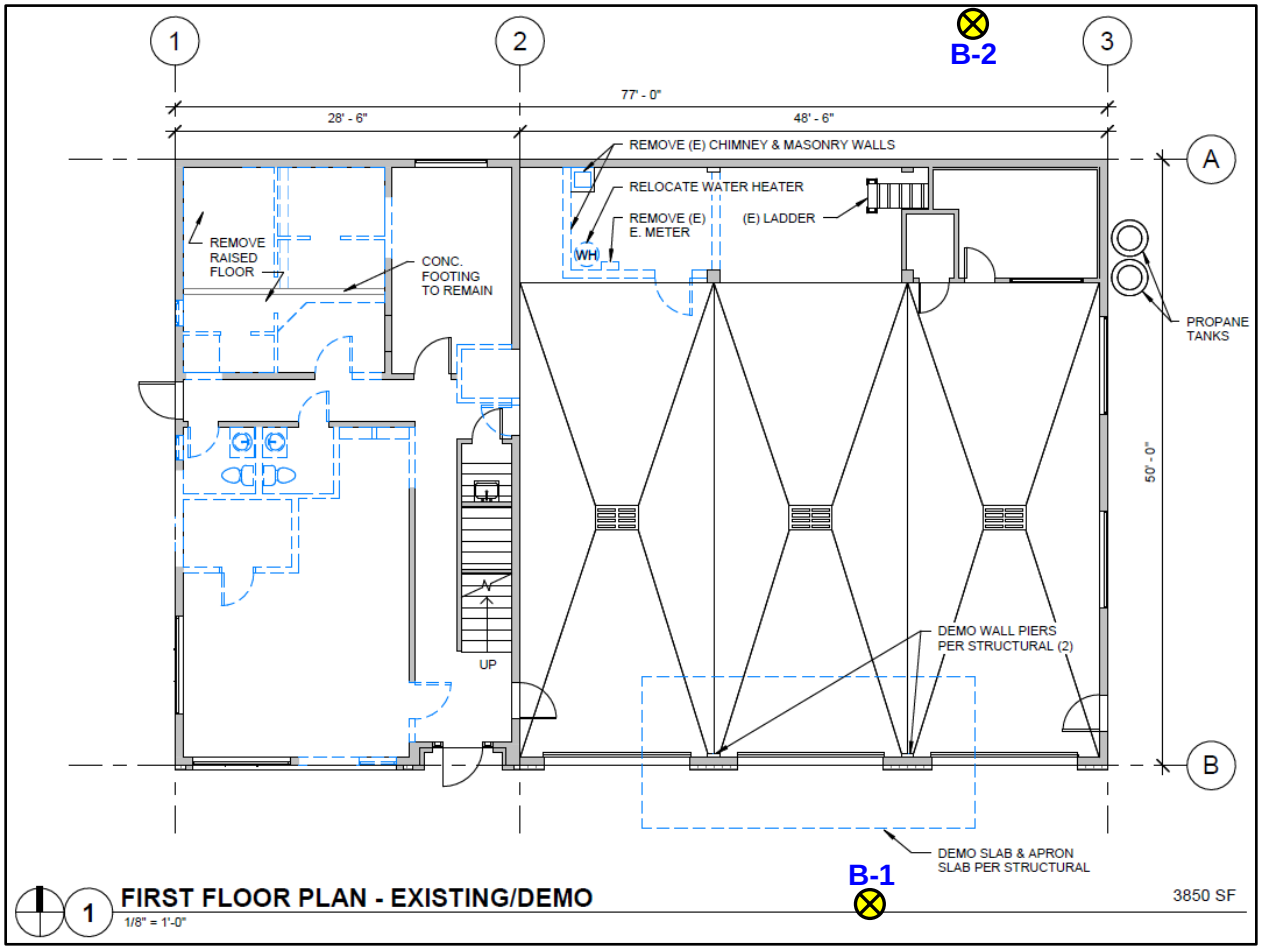

Figure 4: Boring Location Plan (base plan: Architectural drawing sheet A2.1 entitled *First Floor Plan – Existing/Demo*, referenced above).

2.3 Groundwater Information

Groundwater could not be directly observed during drilling due to the use of mud-rotary drilling techniques, however the elevation of fluid remaining in the borehole at boring B-2 was measured at approximately 20 feet bgs, about 14 hours after completion of B-2.

We also consulted several State of Oregon Water Resources Department historic well reports (available at https://apps.wrd.state.or.us/apps/gw/well_log), for water wells located in the same Township, Range and Section as the subject property (Township 17 South, Range 3 West, Section 32), located about ¼ mile to 2 miles from the subject property. The static groundwater level recorded on the well reports ranged from 20 feet to 166 feet, with the 20 foot static elevation from wells nearest to the subject property.

2.4 ReMi Survey

The refraction microtremor, or ReMi survey, is a method of analyzing surface waves, specifically Rayleigh waves, generated by passive vibration sources such as nearby traffic, distant construction equipment, wind, etc. Surface waves were collected by a seismograph connected to a linear array of geophones. We collected the field data using a DaqLink 4 seismograph with two linear arrays of 24 geophones per array. We used a typical geophone spacing of 15 feet. The arrays ran across the project site in the east-west and north-south directions. The approximate locations of the ReMi survey arrays are shown on the ReMi Location Plan, Figure 5 below. We analyzed the collected shear wave data using Geogiga Surface Plus v9.15 software. We plotted the spectral energy shear wave frequency versus slowness, and picked a line for the dispersion curve consisting of the slowest shear wave velocity at each frequency. We then inverted the resulting curve to create a wavelength versus shear wave velocity plot. Combining this with data from our subsurface investigation data, we plotted the shear wave velocity versus depth for the runs 1 and 2 (Figure 6 and 7 below). The combined average seismic shear wave velocity, V_S100, for both runs, when considering the upper 100 feet of soil and rock, was 741 feet per second. This value is within the range that would classify the site as Site Class D (i.e. 600 to 1,200 feet per second) as defined by Table 20.3-1 of ASCE 7-16, which was adopted by the 2022 OSSC.

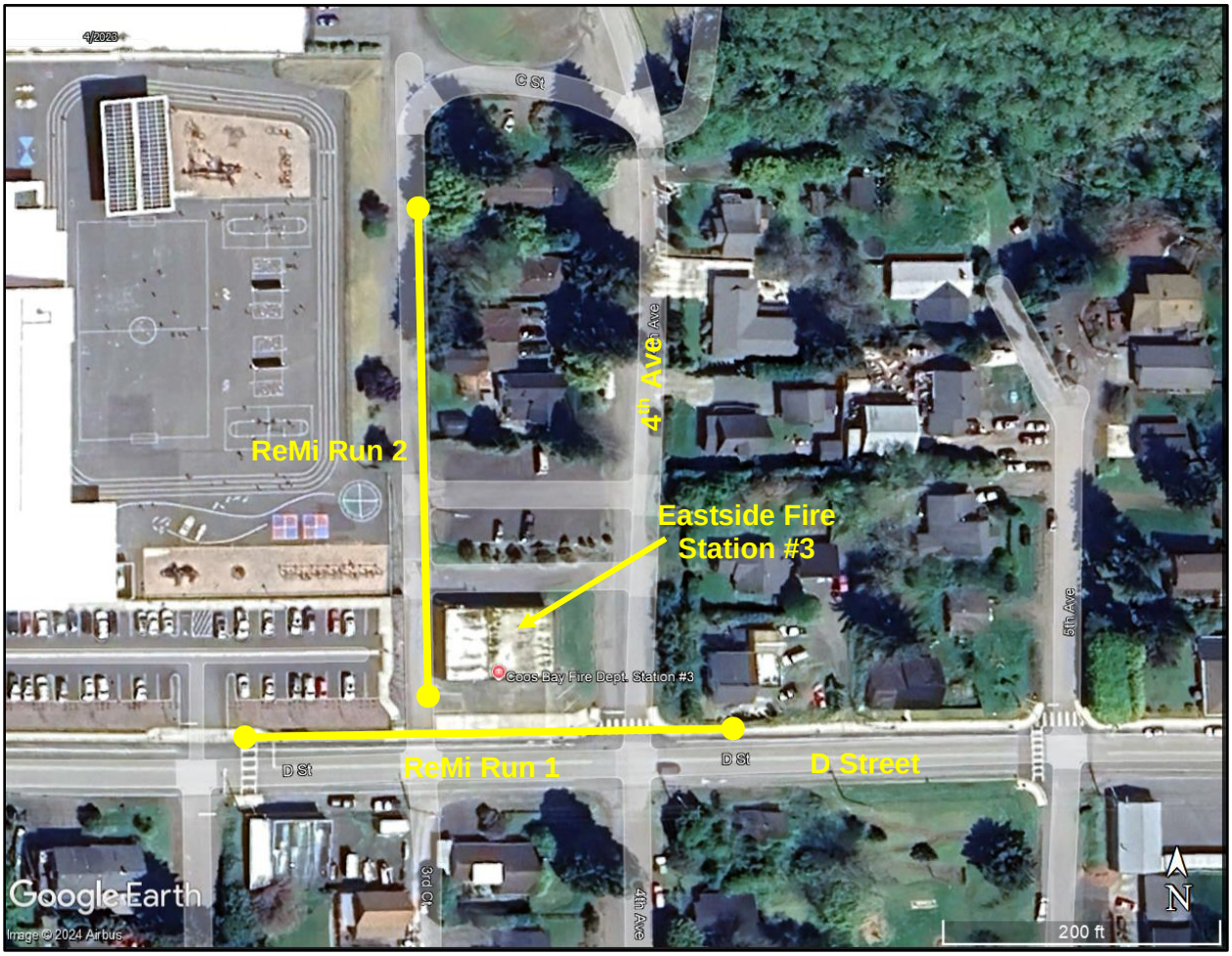

Figure 5: ReMi Location Plan (base aerial image dated April 26, 2023).

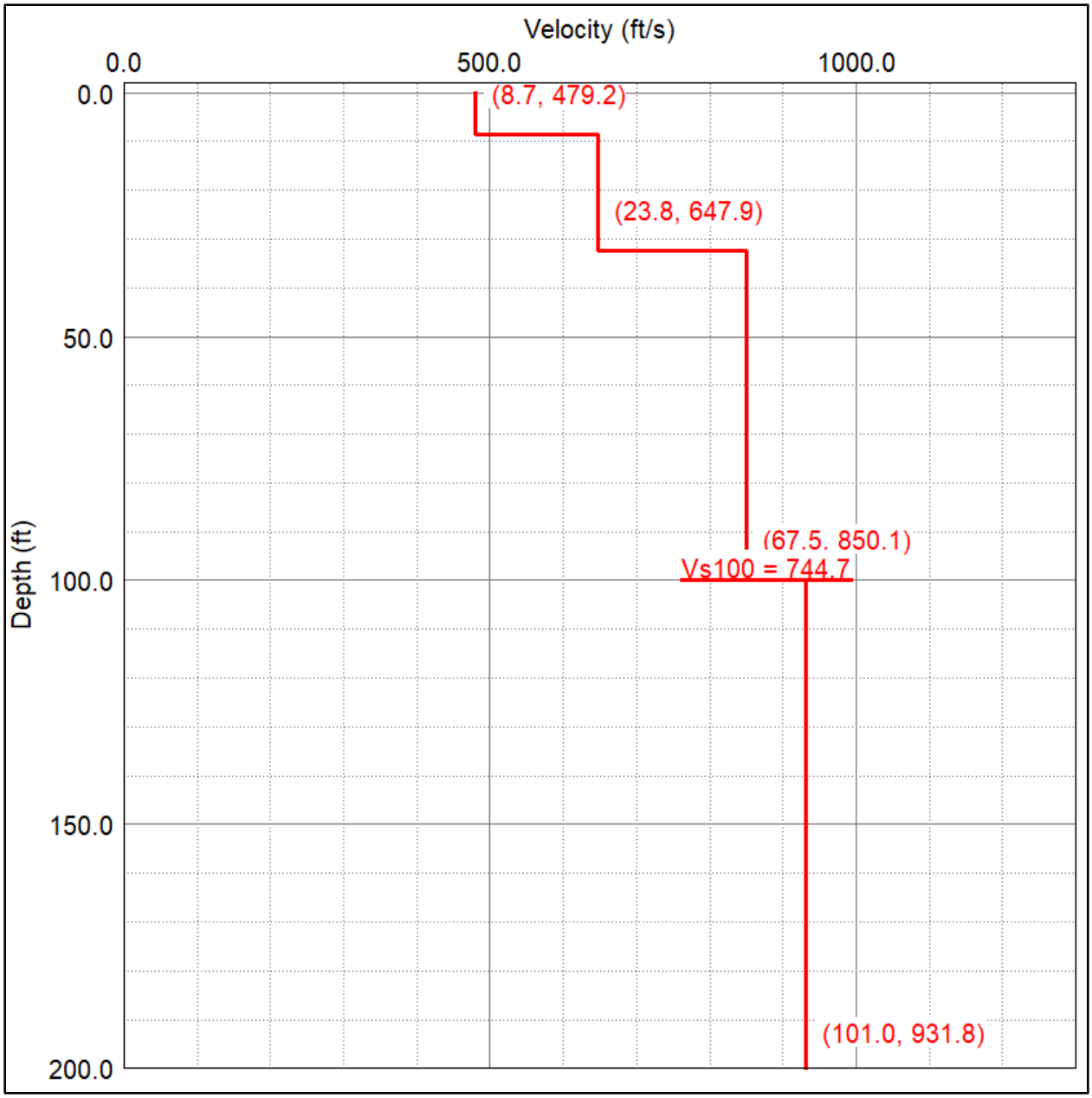

Figure 6: East-west ReMi Run 1 (15-foot geophone spacing).

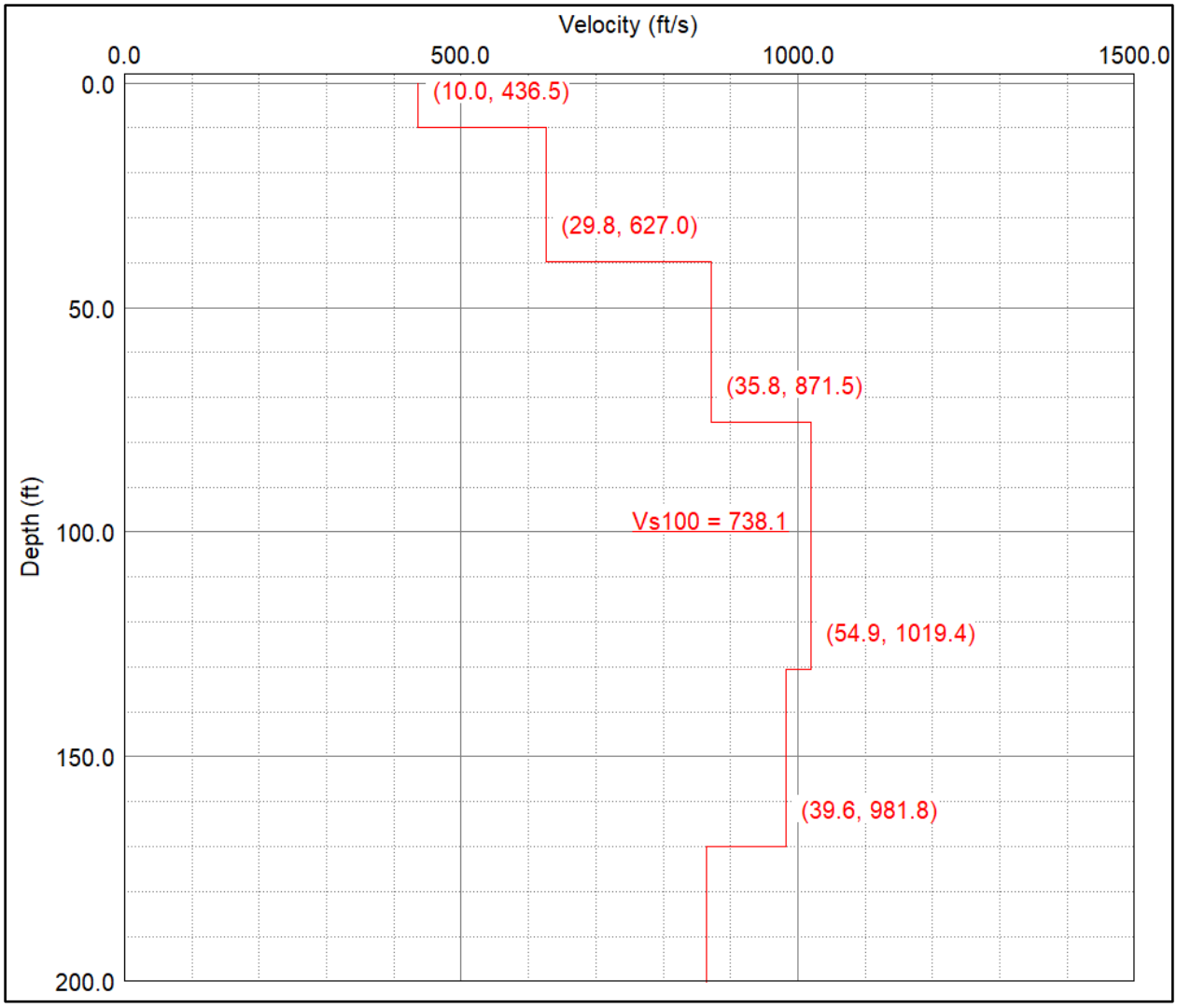

Figure 7: North-south ReMi Run 2 (15-foot geophone spacing).

3.0 SEISMIC SITE HAZARD STUDY

3.1 Introduction

In accordance with the 2022 OSSC, Sections 1803.1, 1803.3.2, and 1803.6, we have completed a Seismic Site Hazard Study for the proposed construction. Section 1803.3.2 requires a Seismic Site Hazard Investigation for buildings defined as Risk Category III or IV in Table 1604.5, which includes “Buildings and other structures designated as essential facilities, including Fire, rescue, ambulance and police stations and emergency vehicle garages”. Section 1803.6 of the 2022 OSSC provides guidance for what needs to be included in the Seismic Site Hazard report. The following subsections address each of the requirements in order.

3.2 Plot Showing Location of Subsurface Explorations

Refer to Figure 4 above.

3.3 Descriptions and Classification of Soils Encountered

Refer to the Boring Logs, Appendix A.

3.4 Groundwater Information

Refer to Section 2.3 above.

3.5 Geologic Profile Extending to Bedrock

In order to characterize the geology extending to bedrock we performed 2 SPT borings (B-1 and B-2). The borings were advanced to a maximum depth of 51.5 feet bgs. In order to extend the subsurface data to 100 feet bgs, we performed ReMi geophysical testing at the site. The locations of the borings and the ReMi test arrays are shown on Figures 4 and 5, respectively, above.

In general, based on our SPT borings, the site is underlain by undocumented fill soil (about 10 feet thick in our explorations), overlying loose/soft to very dense/hard silty sand/sandy silt soils, to a depth of 51.5 feet bgs. Groundwater was measured at approximately 20 feet in boring B-2.

There is relatively good correlation between the depths explored in our borings and the ReMi testing results, in terms of depths of various native soil strata. The ReMi testing indicates an average seismic shear wave velocity of about 741 feet per second for the upper 100 feet, which also indicates the presence of “stiff soil”.

For the purposes of our seismic site hazard study, and based on our subsurface explorations and ReMi testing, we assumed bedrock to be present at and below approximately 45 feet below existing site grade because the strata encountered below 45 feet consisted of either very dense sand or hard silt, interpreted to be a sedimentary bedrock stratum, but in a weathered condition, with a seismic shear wave velocity less than 2,500 feet per second.

3.6 Regional, Geologic, Tectonic and Seismic Settings

3.6.1 Regional Geologic Setting

Refer to Section 2.1 of this report for the regional geologic setting.

3.6.2 Regional Tectonic and Seismic Setting

Oregon's position at the western margin of the North American Plate, and its position relative to the Pacific and Juan de Fuca plates, has had a major impact on the geologic development of the state. The interaction of the three plates has created a complex set of stress regimes that influence the tectonic activity of the state. The western part of Oregon is heavily impacted by the influence of the active subduction zone formed by the Juan de Fuca Oceanic Plate converging upon and subducting beneath the North American Continental Plate off the Oregon coastline. The Columbia Plateau, further to the east, is associated with north-south compression created by the interaction of the Pacific plate with the North American plate[2]. In Oregon, three principal types of earthquakes characterize tectonic earthquake source mechanisms:

1. **Cascadia Subduction Zone (CSZ), or "Interface" earthquakes** occur on the seismogenic part of the interface between the North American plate and the Juan de Fuca plate as a result of convergence of the two plates. According to the Cascadia megathrust fault map on the USGS website (available at https://www.usgs.gov/media/images/cascadia-megathrust-fault-map), the Cascadia Subduction Zone megathrust fault is located approximately 92 kilometers (57 miles) west of the site. This is a potential source of earthquakes large enough to cause ground shaking at the subject property. Research over the last several years has shown that this offshore fault zone has repeatedly produced large earthquakes every 300 to 700 years. It is generally understood that the last great CSZ earthquake occurred about 300 years ago, in 1700 AD. Although researchers do not agree on the likely magnitude, it is widely believed that earthquakes of at least moment magnitude (M_w) 8.5 to 9.5 are possible. The duration of ground shaking could last several minutes.

2. Relatively deep **"Intraslab" earthquakes** occur 30 to 50 kilometers beneath the

[2] Geomatrix Consultants, January 1995. "Seismic Design Mapping, State of Oregon" prepared for Oregon Department of Transportation.

surface, within the seismogenic part of the subducting Juan de Fuca plate. Intraslab earthquakes originate from within the subducting Juan de Fuca Oceanic Plate. These earthquakes occur no less than 30 kilometers beneath the surface, and are not usually associated with visible faults. It has only been possible to distinguish intraslab earthquakes in western Oregon for the past few decades. Numerous small intraslab earthquakes have been recorded beneath western Oregon and the Coast Range. An estimated magnitude 6.7 earthquake near the Oregon coastal town of Port Orford in 1873 was probably Oregon's largest intraslab earthquake[3]. The February 28, 2001, Magnitude 6.8, Nisqually Earthquake, located approximately 11 miles northeast of Olympia, Washington, was likely an Intraslab earthquake with a hypocenter approximately 50 kilometers (30 miles) below the ground surface. The frequency of large events has not been determined due to the short period of records available. The scenario for an intraslab earthquake could include a magnitude 7 to 7.5 event, with severe ground shaking lasting a couple of minutes.

3. Relatively shallow **"Crustal" earthquakes** occur within 10 to 20 kilometers of the surface of the North American plate. Oregon has experienced at least two significant crustal earthquakes in the past—the Scotts Mills earthquake, M_w 5.6, on March 25, 1993, and the Klamath Falls earthquake, M_w 5.9, on September 20, 1993. The Scotts Mills earthquake, while not mapped directly on the Mount Angel fault, is believed to have occurred as a result of Mount Angel fault activity. Based on the limited data available, it is reasonable to assume that a M_w 6.0 to 6.5 crustal earthquake could occur.

3.7 Literature Review of Regional Seismic and Earthquake History

There are no known active faults that travel through the project site, though some faults are mapped in the surrounding areas, based on our review of the United States Geological Survey's (USGS) Map of Quaternary Faults and Folds in Oregon by Stephen F. Personius, Richar L. Dart, Lee-Ann Bradley and Kathleen Haller, 2003 (available at https://pubs.usgs.gov/of/2003/428). It should be noted that it is possible for faults to be present, which are not currently mapped. There are 17 faults, fault zones, or anticlines located within approximately 60 miles of the project site. There appear to be 4 faults within 10 miles of the subject property. These faults are the South Slough Thrust and Reverse Faults (No. 890), East South Slough Faults (No. 889), South Slough Syncline (No. 891) and Sunset Bay-Cape Arago Folds and Faults (No. 888). The faults and fault zones within 60 miles of the site are shown on Figure 8 below and listed in Table 1 below. More detailed descriptions, as well as information on recent activity for each of the faults and fault zones, can be accessed via the USGS fault database available at https://earthquake.usgs.gov/cfusion/qfault/.

[3] A. G. Johnson, D. H. Scofield, and Ian P. Madin, 1994, Earthquake database for Oregon, 1833 through October 25, 1993, Oregon Department of Geology and Mineral Industries Open File Report O-1994-04, 13 p.

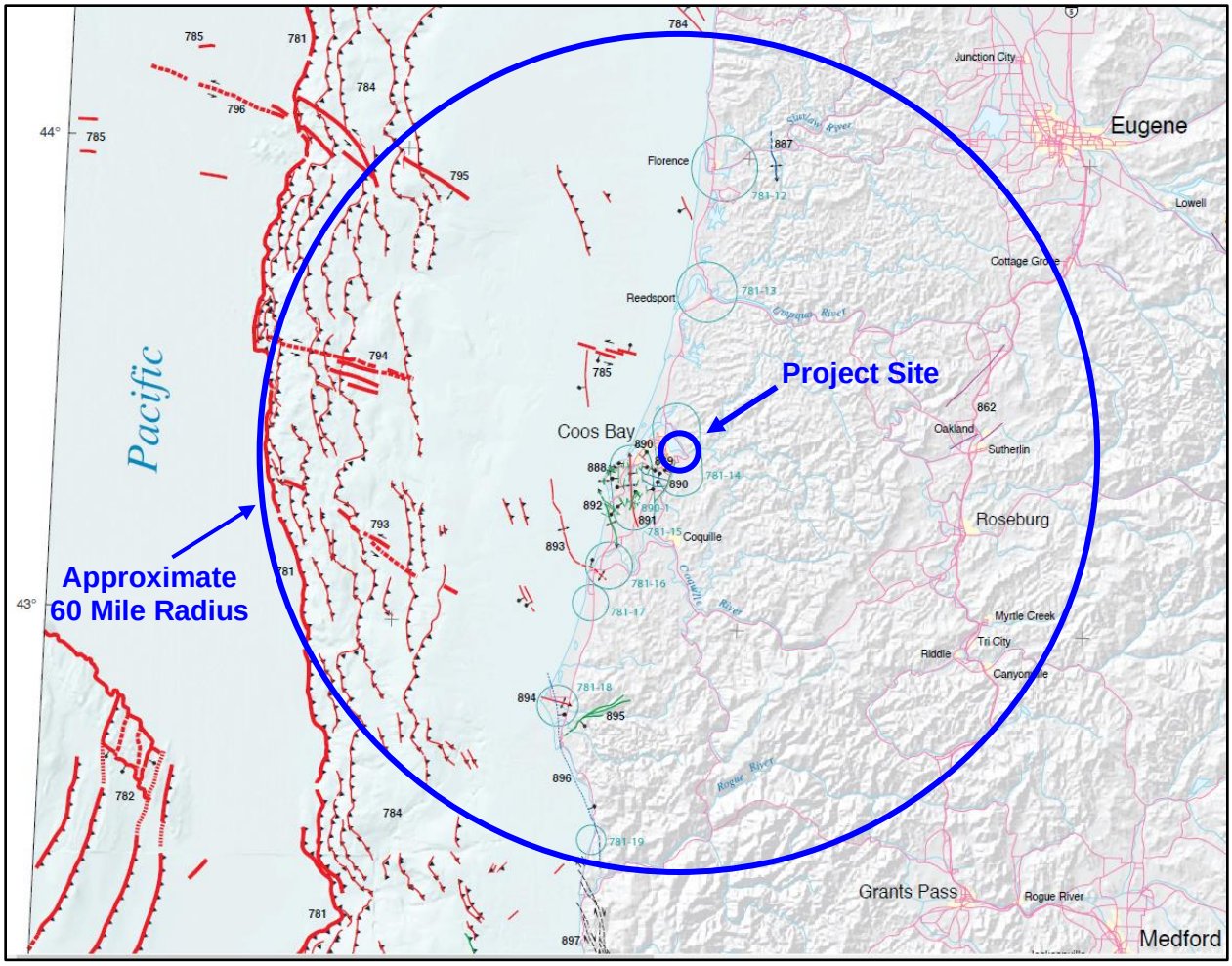

Figure 8: Quaternary Faults within a 60 miles radius of the project site (base map: USGS Map of Quaternary Faults and Folds in Oregon, referenced above).

Table 1: List of Faults, Fault Zones, Synclines or Anticlines Within 60 Miles of Project Site.

Fault Name or Zone	Approximate Distance from Site (mi)	Fault Class	Slip Rate (mm/yr)	Fault Length (km)	Most Recent Deformation (ka = 1000's of years ago)
South Slough Thrust and Reverse Faults (No. 890)	0.75 to 9.5	A	Less than 0.2	16	<15ka
East South Slough Faults (No. 889)	4.0 to 6.0	A	Less than 0.2	8	<750ka
South Slough Syncline (No. 891)	5.5	A	Between 0.2 and 1.0	17	<15ka
Sunset Bay-Cape Arago Folds and Faults (No.	9.0	A	Between 0.2 and 1.0	6	<130ka

888)					
Pioneer Anticline (No. 892)	12.0 to 13.5	A	Between 0.2 and 1.0	14	<130ka
Cascadia Fold and Fault Belt (No. 784)	15.0 to 60.0	A	Between 1.0 and 5.0	484	<15ka
Unnamed Offshore Faults (No. 785)	16.6 to 44.5	A	Between 1.0 and 5.0	280	<15ka
Coquille Anticline (No. 893)	19.0	A	Between 0.2 and 1.0	27	<15ka
Battle Rock Fault Zone (No. 896)	30.0	A	<0.2	48	<750 ka
Thompson Ridge Fault (No. 793)	38.4	A	Greater than 5.0	49	<15ka
Beaver Creek Fault Zone (No. 895)	40.0	A	Between 0.2 and 1.0	18	<130 ka
Cape Blanco Anticline (No. 894)	40.0	A	Between 0.2 and 1.0	8	<15 ka
Coos Basin fault (No. 794)	40.3	A	Greater than 5.0	36	<15 ka
Unnamed Siuslaw River Anticline (No. 887)	43.9	A	Between 0.2 and 1.0	12	<750ka
Heceta Bank Structure (No. 795)	50.0	A	Greater than 5.0	18	<15ka
Cascadia Subduction Zone (No. 781)	59.8	A	Greater than 5.0	547	<15ka
Unnamed Faults near Sutherlin (No. 862)	44.4	B	Less than 0.2	34.5	<750
Source: United States Geological Survey's (USGS) Map of Quaternary Faults and Folds in Oregon by Stephen F. Personius, Richar L. Dart, Lee-Ann Bradley and Kathleen Haller, 2003 (available at https://pubs.usgs.gov/of/2003/428)					

According to the USGS National Earthquake Information Center (NEIC) database, from 1900 to present, three earthquakes of magnitude 4.0 or greater have been recorded within an approximately 60-mile radius of the project site. According to the NEIC database, these events occurred on November 30, 2019, north-northeast of Port Orford, Oregon (M4.2), about 43 miles southwest of the project site; February 26, 2009, northwest of Selma, Oregon (M4.2), about 59 miles southeast of the project site; and June 4, 1925, west-northwest of Langlois, Oregon (M6.0), about 49 miles southwest of the project site (offshore).

3.8 Seismic Source Selection Criteria and Design Earthquake Recommendations

3.8.1 Selection Criteria

Historic information related to seismic activity in the Pacific Northwest is relatively limited. Prior to the settlement of the Oregon Territory in the mid-nineteenth century, the location, magnitude and frequency of earthquake activity is truly speculative. From about the mid-nineteenth century to the 1940's, eyewitness accounts of damage are available but not precise earthquake locations or magnitudes. Seismograph records indicating magnitude and location have been available in Oregon since the 1940's, although the density and quality of seismometers was poor for much of that time. Given the above limitations, there are large uncertainties in predicting future earthquakes based on past history. It is very likely that we don't have a complete understanding of earthquake location, frequency and magnitude that could affect this site.

Based on the limited database of actual earthquake records, it is our opinion that the probabilistic data available from the Conterminous U.S. 2023 (v4.7.2) USGS National Probabilistic Seismic Hazard Model is a good measure of likelihood of earthquake activity in the future. The USGS Disaggregation website, https://earthquake.usgs.gov/nshmp/hazard/disagg provides a deaggregation of the principal sources that contribute to seismic hazards at a specified site. Appendix C shows the deaggregation for seismic hazards that could impact this site. The deaggregation charts indicate the most influential seismic activity, with a potential magnitude of M_w 8.75, is located within about 27.6 kilometers (17.1 miles) of the site. The larger seismic activity (i.e. higher magnitude) is interpreted to be associated with the Cascadia Subduction Zone. It is our opinion that local crustal and Cascadia Subduction Zone earthquakes are the most likely major earthquake threats for the project site when considering the 2,475-year event. As such, those are the events that we focused on in our site-specific seismic spectral response acceleration modeling.

3.8.2 Design Earthquake Recommendations

As discussed below in Section 3.9.3 below, this site has potentially liquefiable soils, which classifies the Site Class as F in accordance with the 2022 OSSC. However, there is a code allowance that permits use of the Site Class (A through E) ground motion parameters determined in accordance with Section 1613.2.2 of the 2022 OSSC and Table 20.3-1 of ASCE

7-16 if the building's fundamental period is not greater than 0.5 seconds. The general assumption is that a structure's fundamental period may be estimated based on multiplying 0.1 seconds times the number of stories. Therefore, since this structure will be less than 5 stories, we assume the building's fundamental period will not be greater than 0.5 seconds and we recommend the ground motion parameters associated with Site Class determined by our site investigation.

The ReMi testing indicated an average site shear wave velocity, V_S100, of 741 feet per second (226 meters per second) for the upper 100 feet. This value is within the range that would classify the site as Site Class D (i.e. 600 to 1,200 feet per second) as defined by Table 20.3-1 of ASCE 7-16, which was adopted by the 2022 OSSC.

Inputting our recommended Site Class as well as the site latitude and longitude into the Structural Engineers Association of California (SEAOC) – Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps website (http://seismicmaps.org) which is based on the United States Geological Survey, we obtained the seismic design parameters shown in Table 2 below. The return interval is 2% probability of exceedance in 50 years.

Table 2: 2022 OSSC Seismic Design Parameter Recommendations

Parameter	Recommendation
Site Class	D
S_s	1.579g
S_1	0.798g
F_a	1.0
F_v	1.70
S_{MS} (=S_s*F_a)	1.579g
S_{M1} (=S_1*F_v)	1.357g
S_{DS} (=2/3*S_{MS})	1.053g
Design PGA (=PGA_M / 1.5)	0.577g
MCE_G PGA	0.786g
F_{PGA}	1.10
PGA_M (=F_{PGA} x MCE_G PGA)	0.865g

Note: Site Latitude = 43.3648417°, Site Longitude = -124.1960477°

Section 1803.3.2.1 of the 2022 OSSC requires that design earthquakes be considered with magnitudes no less than the following:

- Shallow crustal design earthquake – at least Moment Magnitude 6.0
- Intermediate oceanic intraslab design earthquake – at least Moment Magnitude 7.0
- Deep subduction zone interface design earthquake – at least Moment Magnitude 8.5

According to the NEIC database, from 1900 to present, three earthquakes of magnitude 4.0 or greater have been recorded within an approximately 60-mile radius of the project site. According to the NEIC database, these events occurred on November 30, 2019, north-northeast of Port

Orford, Oregon (M4.2), about 43 miles southwest of the project site; February 26, 2009, northwest of Selma, Oregon (M4.2), about 59 miles southeast of the project site; and June 4, 1925, west-northwest of Langlois, Oregon (M6.0), about 49 miles southwest of the project site (offshore). The lack of historical earthquake activity reported by USGS should be treated cautiously as the time period of available data (1900 to present) is extremely short when compared to our geologic history (millions of years).

USGS probabilistic seismic hazard deaggregation data estimates mean seismic activity with a potential of a M_w 8.75 acting at a mean distance of 27.6 kilometers (17.1 miles) away when considering all the earthquake sources (faults and fault zones) in the area. The deaggregation also presents the modal events (i.e. most frequently occurring) of M_w 9.05 are possible at a distance of about 27.6 kilometers (17.1 miles) away. Considering all of this data, we recommend utilizing the magnitudes given by the deaggregation as opposed to the minimum magnitudes suggested by the 2022 OSSC outlined above.

3.8.3 Design Earthquake Recommendations

Based on the USGS Seismic Deaggregation attached in Appendix C, the earthquake ground motions at the site are controlled by shallow crustal events and deep subduction zone events. We selected 12 total ground motions, six (6) of the ground motions were for crustal events, and six (6) were deep subduction zone events. When possible, the histories were selected based on magnitude and fault distance values that were in the range of the seismic deaggregation figures referenced above. A summary of the selected ground motion acceleration histories is listed in Table 5 below.

As required in Section 16.2.3.1 of ASCE 7-16, the ground motion records were scaled such that the average value of the 5 percent damped response spectra for the suite of motions was not less than the Site Class B design response spectrum for the site for periods ranging from 0.2T to 2.0T, where T is the natural period of vibration for the structure. We have not been provided with the existing building's natural period of vibration from the Structural Engineer. As such, we have assumed a T value based on the rule of thumb that the natural period of the structure can be preliminarily estimated by multiplying the number of stories by 0.1 seconds, or T = 2 stories x 0.1 = 0.2 seconds. As such, ground motions were scaled to match the Site Class B code-based response spectra between about 0.2 x 0.2 = 0.04 seconds, and 2 x 0.2 = 0.4 seconds. The earthquake ground motion record scaling factors are listed in Table 3 below. If the Structural Engineer determines the natural period of vibration for the proposed buildings is greater than about 0.2 seconds, we should be contacted to provide an amended response spectrum.

Table 3: Summary of Selected Earthquake Records.

Earthquake	Recording Station	Magnitude	Measured Peak Horizontal Ground Acceleration (g)	Scaling Factor
Loma Prieta (shallow crustal)	Anderson Dam Downstream, 360° component, USGS Station #1652)	6.9	0.26	2.5
Loma Prieta (shallow crustal)	Anderson Dam Downstream, 270° component, USGS Station #1652)	6.9	0.26	2.5
Northridge, 1/17/94 (shallow crustal)	Big Tujunga, 262° component, USC Station 90061	6.7	0.16	2.5
Northridge, 1/17/94 (shallow crustal)	Big Tujunga, 352° component, USC Station 90061	6.7	0.16	2.5
Palm Springs, 7/8/86 (shallow crustal)	N. Palm Springs Post Office, 210° component, USGS Station 5070	6.0	0.68	1.7
Palm Springs, 7/8/86 (shallow crustal)	N. Palm Springs Post Office, 300° component, USGS Station 5070	6.0	0.68	1.7
Southern Peru, 6/23/01 (deep subduction)	NS component	8.4	0.3	2.4
Southern Peru, 6/23/01 (deep subduction)	EW component	8.4	0.3	2.4
Michoacan, Mexico, 9/19/1985 (deep subduction)	La Union, component N90W	8.1	0.17	2.5
Michoacan, Mexico, 9/19/1985 (deep subduction)	La Union, component N00W	8.1	0.17	2.5
Valparaiso, Chile, 3/3/1985 (deep subduction)	160° component, U.F.S.M	8.0	0.17	2.5
Valparaiso, Chile, 3/3/1985 (deep subduction)	70° component	8.0	101	2.5

We used SHAKE2000 computer modeling software by Geomotions to perform the linear 1-D analysis. The subsurface model to develop a site-specific response spectrum was based on our exploration logs and ReMi analysis.

Figure 9 below demonstrates that we scaled the selected earthquake records appropriately such that the site specific curve is not less than the 2022 OSSC Site Class B curve between 0.2T and 2.0T (i.e. 0.04 and 0.4 seconds).

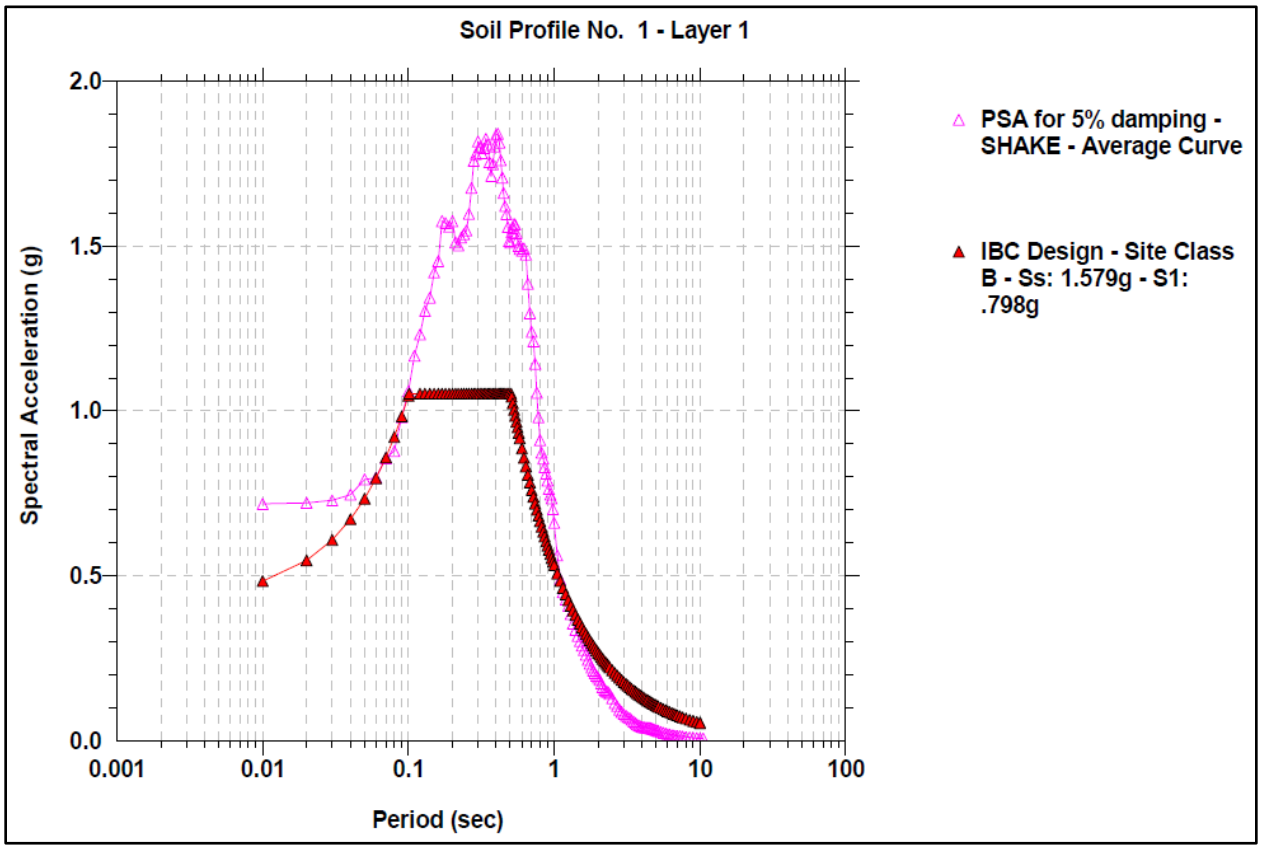

Figure 9: Site specific response spectra for the average of the 11 ground motion records compared to the OSSC design spectra for Site Class B.

Figure 10 below represents the site specific seismic response curve plotted against the Site Class D code curve (2022 OSSC). Figure 10 below should be used in the structural design.

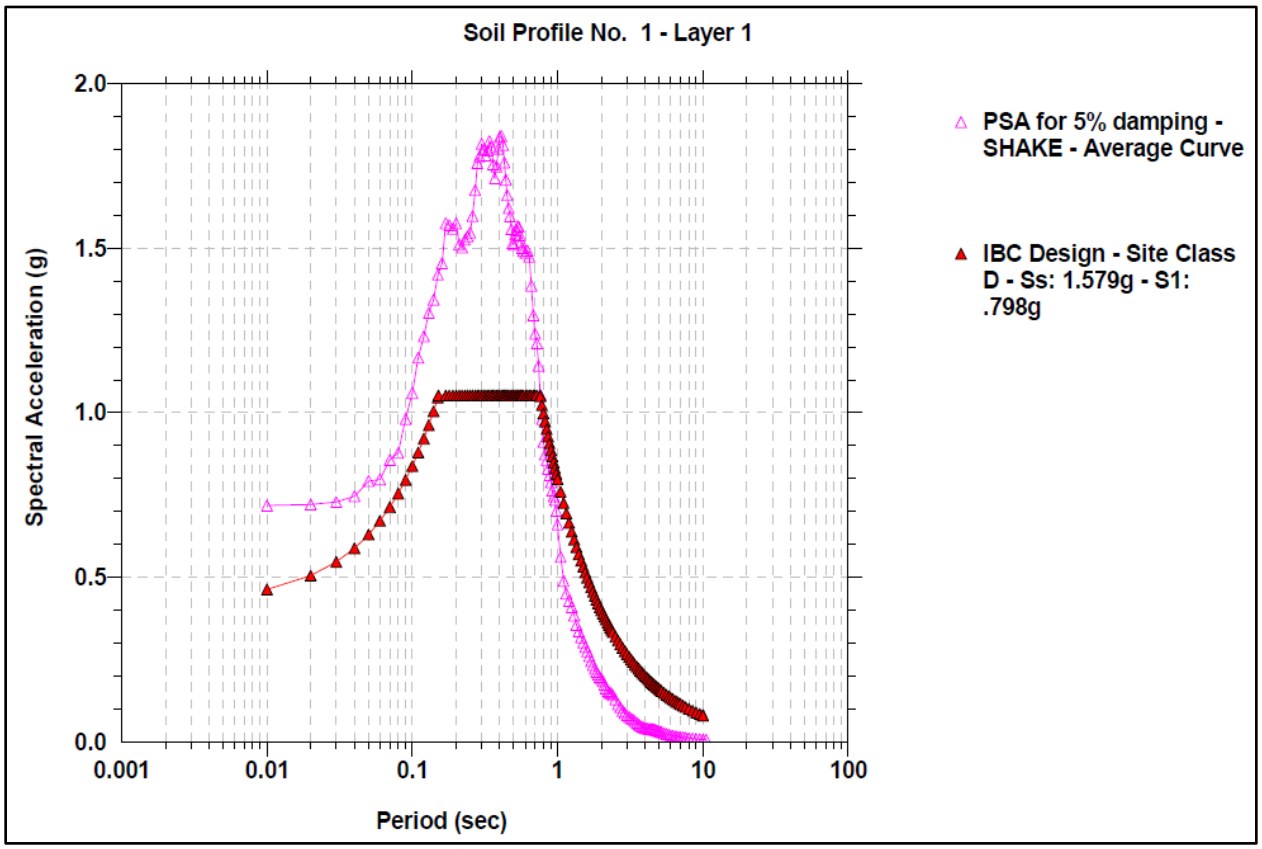

Figure 10: Site specific response spectra for the average of the 11 ground motion records compared to the OSSC design spectra for Site Class D.

In accordance with ASCE 7-16, Sections 21.4, the parameter S_{MS} was determined by taking 90 percent of the maximum spectral acceleration from the site-specific design response spectrum at any period within the range of 0.2 seconds to 5.0 seconds. Vs_{30} was less than 1,200 feet per second, therefore, the parameter S_{M1} was taken as the maximum value of the product, T x S_a, for the period range of T = 1.0 to T = 5.0 seconds. To calculate S_{DS} we took 2/3 of 0.9 x S_a. The maximum spectral acceleration from the site-specific design response spectrum at any period within the range of 0.2 seconds to 5.0 seconds occurred at T= 0.4 seconds. To calculate S_{D1} we took 2/3 x T x S_a.

We calculated the requested ASCE 41-17 parameters presented in Table 4 below using a ratio of the mapped ASCE 41-17 values to the mapped ASCE 7-16 values.

Based on our site specific seismic response analysis, we recommend the design parameters presented in Table 4 below for the ASCE 7-16 structural design.

Table 4: Site-Specific Seismic Design Parameter Recommendations.

ASCE Standard	Parameter	Recommendation
ASCE 7-16	S_{MS}	**1.70g** (= 0.9 x 1.89g)
ASCE 7-16	S_{M1}	**0.70g** (= 1.0 sec x 0.70g)
ASCE 7-16	S_{DS}	**1.13g** (= 2/3 x S_{MS})
ASCE 7-16	S_{D1}	**0.47g** (= 2/3 x S_{M1})
ASCE 41-17, BSE - 2E	S_{xs}	**0.834g**
ASCE 41-17, BSE - 2E	S_{x1}	**0.33g**
ASCE 41-17, BSE - 1E	S_{xs}	**0.279g**
ASCE 41-17, BSE - 1E	S_{x1}	**0.082g**

3.9 Evaluation of Site-Specific Seismic Hazards

3.9.1 Fault Rupture Hazard

Based on our review of the geologic literature and geologic maps, there are no known potentially active faults that travel through the project site. However, there are faults as close as 0.75 miles from the site, as presented in Table 1 above. Due to the small degree of Quaternary age faulting and the relatively low amount of tectonic activity in the immediate area, it is our opinion that the fault rupture hazard for the site is low. However, it should be noted that western Oregon is considered to be seismically active and that new faults can occur as branches off existing faults or as new fractures. It is possible that there are faults present that are not currently mapped. The Oregon Statewide Geohazards Viewer (https://gis.dogami.oregon.gov/maps/hazvu/) indicates the site is mapped as having potentially very strong ground shaking during design-level seismic events.

3.9.2 Earthquake Induced Ground Subsidence

Based on the subsurface explorations, the site is underlain by loose/soft to very dense/hard silty sand/sandy silt soils. Groundwater was measured at approximately 20 feet in boring B-2. In our professional opinion, and based on our subsurface investigation, there is a risk of earthquake induced ground subsidence (i.e. dynamic settlement due to liquefaction) on the subject property when considering the site geology and the consistency/density of the native soils encountered. See Section 3.9.3 below for detailed recommendations and analysis.

3.9.3 Liquefaction and Lateral Spread Hazard

Liquefaction occurs when a saturated sand or silt soil starts to behave like a liquid. Liquefaction occurs because of the increased pore pressure and reduced effective stress between solid particles because of the presence of liquid. It is often caused by severe ground shaking, especially that associated with earthquakes. According to the State of Oregon's Statewide Geohazards Viewer (https://gis.dogami.oregon.gov/ maps/hazvu/) the site is mapped within a low Liquefaction Susceptibility Hazard area, but near areas of High Liquefaction Susceptibility Hazard. As mentioned above, based on our subsurface explorations, the site is generally underlain by layers of stiff to hard silts, and medium dense to very dense sands.

In our professional opinion, and based on our subsurface investigation, there is a risk of earthquake induced ground subsidence (i.e. liquefaction) on the subject property when considering the site geology and the consistency/density of the native soils encountered in our subsurface explorations.

Potentially liquefiable Silty Sand (SM) and Sandy Silt (ML) soils were encountered below the measured groundwater level of 20 feet bgs, in both borings B-1 and B-2. The thickness of the potentially liquefiable soil layer encountered in boring B-2 was most significant, and ranged from approximately 20 to 40 feet bgs in boring B-2. between 20 to 40 feet bgs in boring B-2.

We performed a detailed liquefaction analysis using Liquefy Pro software, Version 5.8n, distributed by CivilTech Software. The following input parameters were used:

- Peak Ground Acceleration (PGA_M) of 0.865g. In accordance with ASCE 7-16 Section 11.8.3, the PGA_M value was used instead of Design PGA because the Seismic Design Category is D as defined in ASCE 7-16 Table 11.6-1.
- An assumed moment magnitude earthquake of 9.0.
- Groundwater was assumed to be at 20 feet bgs.
- The SPT N_{60} values we input were already corrected using a hammer energy correction value of 1.36, therefore we used a C_e value of 1.0 in the software analysis.
- C_b (borehole diameter correction) value of 1.0.
- C_s (sampler correction) value of 1.0.
- Ishihara/Yoshimine settlement calculation method.
- Modified Stark/Olson et al. fines correction method.
- A Factor of Safety (FOS) of 1.3 was used when evaluating whether a soil would liquefy or not (i.e. soil layers below a safety factor of 1.3 were considered potentially liquefiable).

Based on the above parameters, our analysis indicated that a maximum of about 5.4 inches of potential total dynamic settlement due to liquefaction could occur during a design level seismic event. Maximum differential settlement due to liquefaction could be on the order of about ½ to 2/3 of total dynamic settlement, or 2.7 to 3.5 inches, during a design level event. All of the calculated settlement occurred in the soils above about 36 feet below existing grade. Based on our past experience, the total potential dynamic settlement result of 5.4 inches is greater than the typical limit that most structural engineers find acceptable (i.e. up to about 3 to 4 inches). As

such, in our professional opinion, mitigation to reduce the amount of potential dynamic settlement is appropriate for the proposed construction.

Typical liquefaction mitigation measures include supporting the structures on deep foundations or utilizing more rigid and fully integrated shallow foundations (i.e. interconnected grade beams). Ultimately, the project Structural Engineer will need to review the estimated dynamic settlement values and determine if mitigation is required to reduce the amount of potential dynamic settlement. Consideration should be given to how the new construction will interact with old construction by the Structural Engineer (i.e. will there be excessive differential structural movement). A summary presentation of our Liquefy Pro analysis is included in Appendix D.

3.9.4 Earthquake-Induced Landslide Hazard

In our professional opinion, the risk of slope instability on the subject property is considered low, because there are no steep slopes present on the site. A review of the State of Oregon's online Statewide Landslide Information Layer Web Map for Oregon SLIDO Version 4.4, and the State of Oregon's HazVu Statewide Geohazards Viewer, shows that the site is mapped within a Moderate Landslide Hazard area (see Figure 11 below). The nearest historic landslide feature is mapped about 0.7 miles southeast of the subject property. It should be noted that no past landslide activity had been mapped for the property. Note that our currently authorized services do not include a detailed, quantitative evaluation of local shallow slope stability or any type of evaluation of global, deep-seated slope stability.

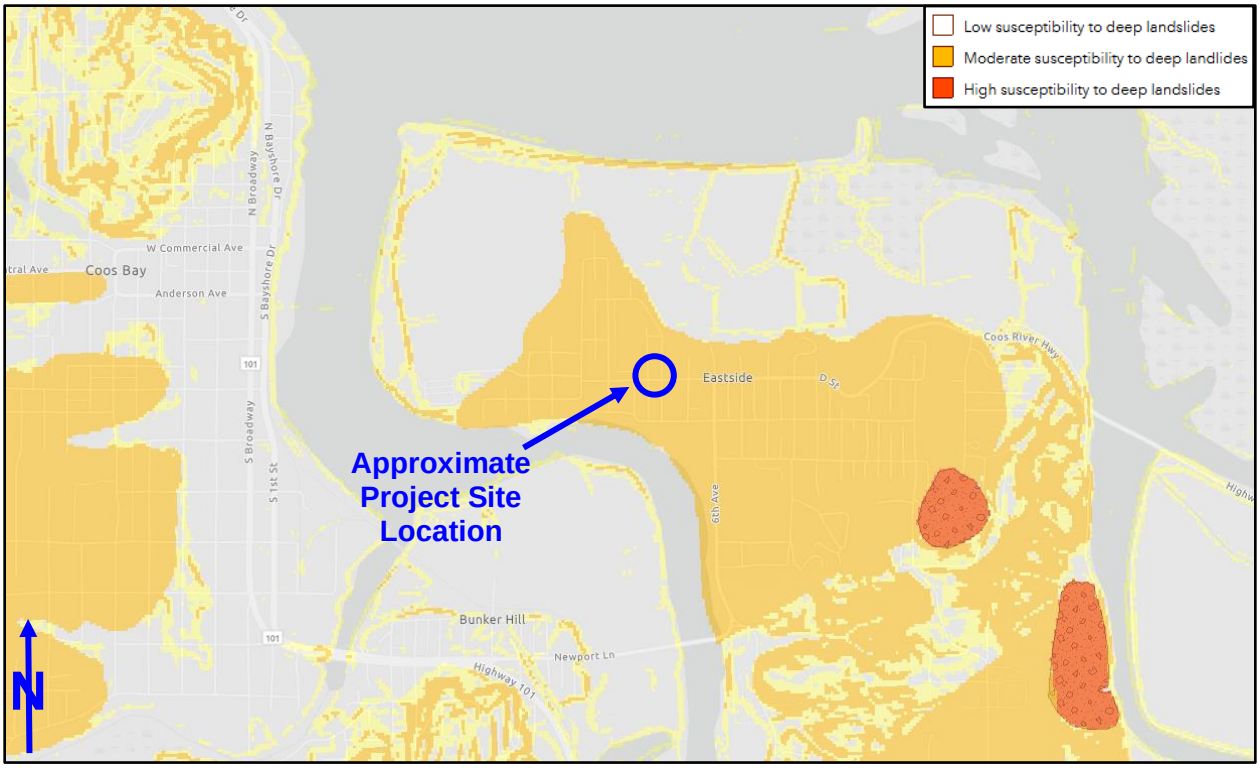

Figure 11: State of Oregon's Oregon HazVu Statewide Geohazards Viewer Landslide Map of project site and vicinity.

3.9.5 Tsunami and Seiche Hazards

A tsunami, or seismic sea wave, is produced when a fault under the ocean floor shifts vertically, displacing the seawater above it. A seiche is a periodic oscillation of a body of water that results in a change of water levels. Oregon Senate Bill 379 (1995) instructed State of Oregon Department of Geology and Mineral Industries DOGAMI to establish the area of expected tsunami inundation based on scientific evidence and tsunami modeling. Based on the DOGAMI Tsunami Inundation Map (TIM) Series (available at http://www.oregongeology.org/pubs/tim/p-tim-overview.htm), tsunami and seiche are not considered to be hazards at this site because the site is outside of the regulatory tsunami inundation line, commonly known as the Senate Bill 379 line (Oregon Revised Statutes 455.446 and 455.447).

3.10 Recommendations for Site Preparation and Foundation Type

Refer to Section 4.0 below.

4.0 EVALUATION AND FOUNDATION RECOMMENDATIONS

4.1 Geotechnical Discussion

It is our professional opinion that the primary factors influencing the proposed construction are:

1. **Potentially liquefiable soils.** As discussed in Section 3.9.3 above, in our professional opinion, based on our subsurface investigation and analysis, there is a risk of earthquake induced ground subsidence (i.e. liquefaction) on the subject property, when considering the site geology and the consistency/density of the native soils encountered in our subsurface explorations. Potentially liquefiable Silty Sand (SM) and Sandy Silt (ML) soils were encountered below the measured groundwater level of 20 feet bgs, in boring B-2. The thickness of the potentially liquefiable soil layer encountered in boring B-2 was most significant, and ranged from approximately 20 to 40 feet bgs in boring B-2.

2. **Undocumented fill materials.** As discussed above, the soil layer underlying the pavement in both borings appeared to be soft to medium stiff undocumented fill materials. This silty clay fill was likely placed during construction of the existing building to level the building pad. Based on the SPT N_{60}-values (4 to 7), the fill does not appear to have been properly compacted. Based on visual examination of the soil samples obtained, the subsurface data, and review of the original Eastside City Hall plans, the fill encountered in our explorations appeared to be about 10 feet thick. Variations in the presence of fill material should be expected between site locations.

3. **Limited boring access.** Accessible areas of the site were limited due to the existing building and utilities. As such, there is some risk that subsurface conditions could vary from what is reported on our boring logs.

4. **Influence of proposed construction on existing facility.** Special considerations may be required to protect the stability of the existing structure when the new construction occurs. This may include temporary structural bracing and temporary shoring. While temporary shoring was not included in our scope of services, we will be available to modify our scope to provide geotechnical recommendations upon request. Note that we have not included an evaluation of how the proposed construction could negatively influence the existing structure in our scope of services.

Given the presence of poorly compacted fill soils and potentially liquefiable soils, we do not recommend the use of conventional shallow foundations as they could experience excessive static and dynamic settlement. Instead, we recommend the use of a deep foundation system. We understand the project design team has already elected to use a drilled and grouted micropile deep foundation system, which is appropriate in our professional opinion.

In summary, provided the recommendations in this report are adhered to, we do not foresee any major issues that would preclude the proposed construction. The factors mentioned above are

listed to draw the attention of the reader to the issues to address during design and construction of the proposed improvements.

4.2 General Site Preparation

We envision that existing underground utilities and any vegetation, roots, or other deleterious soils will need to be stripped and removed from beneath proposed structurally improved areas.

Utilities will need to be located and rerouted as necessary and any abandoned pipes or utility conduits should be removed to inhibit the potential for subsurface soil erosion. Utility trench excavations should be backfilled with properly compacted structural fill which is constructed as outlined in Section 3.3 of this report.

After stripping, excavating and backfilling to the proposed subgrade level, as required, new building slab subgrade areas should be proofrolled with a fully loaded, tandem axle dump truck or similar rubber-tired vehicle. Soils that are observed to rut or deflect excessively under the moving load (proofroll) or observed to be soft when probed, should be undercut and replaced with properly compacted structural fill. If a proofroll is not possible, then at a minimum, the Geotechnical Engineer or their representative should probe the exposed subgrade soils (using a steel geo-probe) to ensure they are firm and unyielding.

Where fills are constructed on slopes steeper than 5H:1V, the slope should be benched prior to fill placement. Level benches should be a minimum of 4 feet wide laterally, and should be cut into the slope for no greater than every five feet of vertical rise. The placement of structural fill should begin at the base of the slope. All benches should be inspected by a representative of the Geotechnical Engineer and approved prior to placement of structural fill lifts. If evidence of seepage is observed in the bench excavations, a supplemental drainage system may need to be designed and installed to prevent hydrostatic pressure buildup behind the fill. Permanent slopes should be graded no steeper than 2H:1V. Temporary slopes may be excavated steeper than 2H:1V in accordance with OSHA regulations.

4.3 Structural Fill

We recommend structural fill consist of imported crushed rock gravel or imported clean sand. Imported crushed rock gravel structural fill should be relatively well graded, contain at least 5 percent soil passing the U.S. #200 sieve, have a liquid limit less than 45 and plasticity index less than 25, and have a maximum particle size of 1-1/2 inches. Any imported or on-site material proposed to be used as structural fill should be evaluated by the geotechnical engineer's representative prior to being imported to the site or placed.

All structural fill should be compacted to a minimum of 95 percent of the maximum dry density as determined by the Modified Proctor. The Modified Proctor can either be the ASTM D1557 or AASHTO T180 test methods. In addition, we recommend structural fill be moisture conditioned to within 3 percentage points below and 2 percentage points above optimum moisture as

determined by ASTM D1557 (Modified Proctor). If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying.

Structural fill should be placed in a relatively uniform horizontal lift on the approved subgrade. Each loose lift should be no greater than about 1-foot in thickness. The type of compaction equipment used will ultimately determine the maximum lift thickness. Each lift of compacted engineered fill should be tested by a representative of the Geotechnical Engineer prior to placement of subsequent lifts.

4.4 Foundation Recommendations

Given the potentially liquefiable soils and poorly compacted existing fill soils encountered in our subsurface exploration, and the existing site access constraints in regard to the proposed building improvements, we envision that the planned drilled and grouted micropiles are an acceptable foundation option. To mitigate the potential for excessive dynamic settlement, we recommend supporting the entire building on drilled and grouted micropiles that penetrate down below the potentially liquefiable soils (i.e. below 40 feet bgs).

4.4.1 Drilled and Grouted Micropile Recommendations

Micropiles typically range from 4 to 12 inches in diameter, include a single steel center bar, and sometimes include permanent steel pipe casing. Micropiles are grouted in place using “neat” cement (i.e. water and Portland cement).

The micropiles for this project should be embedded into the hard/dense, sandy silt/silty sand stratum below the elevation of the potentially liquefiable stratum, which ranged from about 25 bgs in boring B-1, located on the south side of the building, to about 40 feet in boring B-2, located on the north side of the building. We recommend all micropiles be extended to at least 40 feet bgs.

We recommend 6-inch diameter, drilled and grouted micropiles with a centered reinforcing bar be used to support the existing building. Micropile length should be determined by the load capacity required by the Structural Engineer, but all micropiles should be at least 40 feet long and embedded at least 10 feet into the hard/dense soil stratum. The piles should be cased in the upper 20 feet using N80 casing with a wall thickness of 0.408 inches and an outside diameter of 6 inches.

Using an average ultimate grout/soil bond strength of 10 psi and a Factor of Safety of 2, then 6-inch diameter micropiles are estimated to have allowable compressive/uplift capacities presented in Table 5 below.

Table 5: Recommended Allowable Axial Capacity.

Micropile Diameter (inches)	Allowable Axial Load Capacity[1,2,3] (kips per linear foot)
6	1

Notes:
[1] Embedded at least 10 feet into hard/dense stratum.
[2] A Factor of Safety of 2 has been applied to the ultimate capacity to determine the allowable capacity. This assumes at least 1 micropile will be load tested.
[3] The average ultimate grout/soil bond strength recommendation above has been included in the calculation.

Note that we are recommending that the first 40 feet of micropile length be ignored for skin friction because of the potentially liquefiable soils.

For lateral capacity, we recommend using battered piles with allowable lateral capacity determined based on the lateral force component of the pile's allowable axial capacity.

Based on our subsurface explorations, we anticipate that drilling in the hard/dense strata may be difficult. We recommend a post-grout tube be installed in each micropile. Grout should consist of a high performance, non-shrink grout with a compressive strength (f'g) no less than 5,000 psi at 28 days. One set of 2-inch grout cubes should be made by the geotechnical special inspector for each day that micropiles are grouted. The center reinforcing bar should be adequately sized by the project Structural Engineer to withstand the maximum permanent and test loads. Centralizers should be used with the micropile reinforcing bars at a spacing not to exceed 7 feet. The first centralizer should be installed within 18 inches of the end of the bar. A representative of the Geotechnical Engineer should be present during micropile installation and load testing.

The quantity, spacing, and location of the micropiles should be specified by the Structural Engineer. In addition, the Structural Engineer should design the micropile connection to the foundation.

Provided our recommendations above are followed, we anticipate that total and differential settlement will be less than 1 inch and ½-inch between foundation elements, respectively.

4.4.2 Micropile Axial Compressive Load Testing

Our experience has shown that actual allowable compressive micropile capacities can vary from our calculated values. As such, we recommend at least one axial compressive load test be performed to confirm our design recommendations. In addition, Table 5 above provides the allowable axial load capacity based on a Factor of Safety of 2, which requires that at least one load test be performed. If a load test is not performed, then a Factor of Safety of 3 should be applied (i.e. the allowable axial load capacity would be 0.67 kips per linear foot of micropile).

Load testing should be conducted in general accordance with ASTM D1143, “Piles Under Static Axial Compressive Loads.” The contractor may elect to substitute a tension test (ASTM D3689) for a compression test. We recommend pile load testing be conducted on the first production micropile(s) (before any additional micropiles are installed) so that adjustments can be made to the design (i.e. spacing, length) if the actual test load achieved is less than what is estimated in this report.

The load test should not be taken to more than 80 percent of the minimum ultimate strength of the center bar. We do not plan to test the micropile to failure, therefore, a production pile may be used as the test micropile. The micropile load test should be conducted by the contractor under the supervision of the Geotechnical Engineer. The untested micropiles should be installed following the same procedures that will be used to install any production piles that are load tested.

4.5 Floor Slabs

With regard to soil liquefaction, we anticipate that floor slabs could settle during an earthquake (i.e. up to approximately 5.4 inches total and 3.5 inches differential). While we would expect this amount of settlement to damage floor slabs, we do not anticipate it would be a life-safety issue. Ultimately, this risk should be evaluated by the project Structural Engineer.

In order to mitigate dynamic settlement caused by an earthquake, floor slabs could be designed as structural slabs that are supported on the micropiles, as outlined above, or alternatively, floor slabs could be designed as conventional, grade-supported slabs per the recommendations below.

We have assumed maximum floor loads with not exceed 250 psf. We recommend conventional grade-supported slabs be supported on at least 24 inches of well compacted structural fill (as outlined in Section 4.3 above), underlain by geotextile fabric (Mirafi 500x or equivalent). Where subgrade soils are determined by the geotechnical representative on site to be excessively wet and soft, additional overexcavation may be recommended.

Based on our subsurface explorations performed on October 10, 2024, the design of slabs-on-grade can be based on a subgrade modulus (k) of 125 pci. This subgrade modulus value represents an anticipated value which would be obtained in a standard in-situ plate test with a 1-foot square plate. Use of this subgrade modulus for design or other on-grade structural elements should include appropriate modification based on dimensions as necessary.

Concrete slabs should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

We recommend that a free draining granular mat be placed beneath the floor slab to enhance drainage and provide a capillary break to limit migration of moisture through the slab and provide increased subgrade strength. Note that the recommended thicknesses of well

compacted structural fill placed between new floor slabs and existing fill soils will be sufficient as a free draining mat.

If additional protection against moisture vapor is desired, a suitable vapor retarding membrane may also be incorporated into the design and can be placed on the granular mat to act as a vapor barrier as required by codes or manufacturer requirements. Factors such as cost, special considerations for construction and the specific floor coverings suggest that decisions on the use of vapor retarding membranes be made by the architect and owner.

4.6 Pavement Recommendations

Our scope of services included evaluating the surface soils for the specific purpose of a detailed pavement analysis. The primary factor in the development of the proposed pavement areas on this site are the presence of undocumented, poorly compacted fill materials on the site, as discussed above. We typically would not recommend supporting proposed pavements on any undocumented fill, however, given the thickness of the fill encountered (about 10 feet thick), it may not be economical to remove the fill in its entirety. It may be more economically feasible to only partially remove the fill with the understanding that there may be some select pavement areas that require repairs sooner than normal. Note that the greater the structural fill thickness, the lower the risk of excessive differential settlement, which may adversely impact the life of the pavement.

After the site has been stripped and prepared in accordance with Section 4.2 of this report, the pavement subgrade should be proofrolled with a fully loaded dual axle dump truck. Areas found to be soft or yielding under the weight of a dump truck should be overexcavated as recommended by the Geotechnical Engineer's representative and replaced with additional base course. Using the AASHTO method of flexible pavement design, the following design parameters have been assumed:

- An assumed California Bearing Ratio (CBR) value of 5 for the native or fill stratum that underlies the site.
- A pavement life of 20 years.
- A terminal serviceability (Pt) of 2 (i.e. poor condition).
- A regional factor (R) of 3.0.
- An assumed 18,000-pound equivalent axle load (EAL).
- Assumed traffic loading of:
  - 10 per day for passenger vehicle parking.
  - Periodic emergency vehicle loading
  - Periodic fire truck loading.

Based on our project understanding, the proposed pavements must be designed to support passenger and emergency vehicles, and fire truck loading. An assumed average weight of 4,000 pounds per passenger vehicle, 15,000 pounds per emergency vehicle, and 80,000 pounds per fire truck was used in our calculations. The Project Civil Engineer should review our assumptions to confirm they are appropriate for the anticipated traffic loading. See Tables 7 and 8 below for recommended pavement section thicknesses. Note that the recommended thicknesses assume

the soil subgrade consists of firm undocumented fill materials. In addition, note that the ultimate thickness of the structural fill layer underlying proposed pavements should be determined by an Earth Engineers representative on site.

Table 7: Asphaltic Concrete - Recommended Minimum Thicknesses (inches)

Pavement Materials	Typical Parking Areas	Typical Drive Lane Areas
Asphaltic Concrete	4	6
Crushed Aggregate Base Course, **underlain by Mirafi 500X geotextile fabric or equivalent**	24	24

Table 8: Portland Cement Concrete - Minimum Thicknesses (inches)

Pavement Materials	Typical Parking and Drive Lane Areas
Portland Cement Concrete	6
Crushed Aggregate Base Course, **underlain by Mirafi 500X geotextile fabric or equivalent**	18

The base course should consist of well-graded crushed stone with a maximum particle size of 1-½ inches. Aggregate base course materials should be free of organics or other deleterious materials, be relatively clean (i.e. less than 5 percent soil passing the U.S. #200 sieve), well graded, and have a liquid limit less than 45 and plasticity index less than 25. The base course should be moisture conditioned to within 2 percent of optimum and compacted to a minimum of 95 percent of a Modified Proctor as outlined in Section 4.3 of this report. When placed, the lift base course thickness should generally not exceed 12 inches prior to compacting. The type of compaction equipment used will ultimately determine the maximum lift thickness. In addition, we recommend that the structural fill be placed within +/- 2 percent of the optimum moisture for that material.

The geotextile fabric should be placed over a smooth subgrade and should be placed with no wrinkles. The fabric should be overlapped in accordance with manufacturer recommendations. Construction equipment should not be permitted to travel directly on the geotextile fabric. Water should not be allowed to pond behind curbs and saturate the base course. In down grade areas, base course should extend through the slope to allow any water entering the base course a path to exit.

Asphaltic concrete materials should be compacted to at least 92 percent of the material's theoretical maximum density as determined in general accordance with ASTM D2041 (Rice Specific Gravity).

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Moisture Sensitive Soils/Weather Related Concerns

During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. Therefore, it may, be advantageous to perform earthwork and foundation construction activities during dry weather. The surface soils at this site, if wet, may be prone to rutting when driven over by vehicles. Additionally, it is not uncommon for construction equipment to severely disturb the upper 1 to 2 feet of the subgrade during initial phases of site clearing, grubbing, demolition, etc., especially if site preparation work is performed during wet weather, as is currently planned by the project team. This may result in the need for undercutting and replacement of the disturbed soils if care is not taken by the contractor to protect the moisture sensitive soils. The contractor may also need to construct temporary construction roads. If fine-grained soils are exposed and repeated construction traffic is anticipated, we recommend covering these areas with 18 to 24 inches of coarse gravel underlain by a geotextile fabric to prevent soil contamination of the rock and to protect the underlying subgrade.

5.2 Drainage and Groundwater Considerations

Water should not be allowed to collect in the foundation excavations or on prepared subgrades intended for floor slab support during construction. Positive site drainage should be maintained throughout construction activities. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff.

The site grading plan should be developed to provide rapid drainage of surface water away from the building areas and to inhibit infiltration of surface water around the perimeter of the building and beneath slabs. The grades should be sloped away from the building area. Roof and pavement runoff should be piped (tight-lined) to either an approved system or to an existing storm sewer.

5.3 Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document and subsequent updates were issued to better ensure the safety of workers entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavations or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. Earth Engineers does not assume responsibility for construction site safety or the contractor's compliance with local, state, and federal safety or other regulations.

5.4 Geotechnical Construction Inspections

Earth Engineers should be retained to perform geotechnical construction inspections for any foundation or earthwork related activities to verify construction complies with the geotechnical engineering recommendations contained in this report. Earth Engineers cannot accept responsibility for any conditions that deviate from those described in this report, if not engaged to also provide construction observation for this project.

At a minimum, we recommend the following geotechnical special inspections be performed by Earth Engineers during construction.

- Stability of temporary excavations (periodic).
- Subgrade preparation for floor slabs and pavement (periodic).
- Structural fill placement and compaction (continuous).
- Utility trench backfill compaction (periodic).
- Micropile installation (continuous).
- Micropile load testing (continuous).

We may need to update this list once the construction drawings are completed. Note that the project design team and/or governing jurisdiction may require additional inspections.

6.0 REPORT LIMITATIONS

As is standard practice in the geotechnical industry, the conclusions contained in our report are considered preliminary because they are based on assumptions made about the soil, rock, and groundwater conditions exposed at the site during our subsurface investigation. A more complete extent of the actual subsurface conditions can only be identified when they are exposed during construction. Therefore, Earth Engineers should be retained as your consultant during construction to observe the actual conditions and to provide our final conclusions. If a different geotechnical consultant is retained to perform geotechnical inspection during construction, then they should be relied upon to provide final design conclusions and recommendations, and should assume the role of geotechnical engineer of record.

The geotechnical recommendations presented in this report are based on the available project information, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform Earth Engineers in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. Earth Engineers will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Once construction plans are finalized and a grading plan has been prepared, Earth Engineers should be retained to review those plans, and modify our existing recommendations related to the proposed construction, if determined to be necessary.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of our client, HGE Architects, Inc., for the specific application to the proposed Eastside Fire Station #3 improvements project, to be constructed at the subject property, located at 365 D Street in Coos Bay, Coos County, Oregon. Earth Engineers does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by Earth Engineers.

APPENDICES

APPENDIX A:
BORING LOGS

Appendix A: Boring B-1

EARTH ENGINEERS
An RMA Company

Client: HGE Architects, Inc.
Project: Eastside Fire Station #3 Improvements
Site Address: 365 D Street, Coos Bay, Oregon 97420
Location of Borehole: 14' S, 23' W of SE Building Corner
Date Drilled: 10/10/2024
Logged By: Greg Thibeaux, P.E.

Report Number: 10-242116-1
Drilling Contractor: Holt Services
Drilling Method: Mud Rotary
Drilling Equipment: B-58 Truck Mounted Drill Rig
Ground Surface Elevation (ft msl): 77

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Sampling Data: Blows per 6 Inches	Sampling Data: N_{60}-Value (0 50 100)	Sampling Data: % Passing #200 Sieve	Sampling Data: Liquid Limit	Sampling Data: Plastic Limit	Sampling Data: Moisture Content (%)	Remarks
0			**CONCRETE PAVEMENT** - approximately 6 inches thick.								Surface repaired with non-shrink grout to approximately existing grade.
			FILL - mixed, yellow-brown and dark brown, moist, silty clay fill soil, soft/medium stiff.	SPT-1	1 2 3	7					
2											
4											
6											
8				SPT-2	1 2 3	7				50	
10			**SANDY SILT (ML)** - mottled gray with orange, moist, stiff to hard.	SPT-3	1 2 7	12	72			60	
12											
14											Atterberg Limits (Plasticity Index) result for the SPT 4 sample from 15 to 16.5 feet is "Non-Plastic" per ASTM 4318.
16				SPT-4	6 11 18	39	72			47	
18											
20				SPT-5	3 6 9	20				44	
22											
24											

Notes: Boring terminated in hard SILT (ML), at a depth of approximately 51.5 feet below the ground surface (bgs). Depth to groundwater indeterminate due to mud rotary drilling method. Boring backfilled with bentonite chips on 10/10/2024. Approximate elevation interpolated from Google Earth imagery dated 4/26/2023. Drill rig equipped with SPT auto-hammer. Energy ratio of 1.36 (i.e. 81.6/60 = 1.36) based on measured efficiency of 81.6 percent. Hammer energy efficiency based on report entitled "Energy Measurements for Dynamic Penetrometers", by Shannon & Wilson, dated 1/10/2024. *Lat. = 43.36475, Long. = -124.19599

Appendix A: Boring B-1

EARTH ENGINEERS
An RMA Company

Client: HGE Architects, Inc.
Project: Eastside Fire Station #3 Improvements
Site Address: 365 D Street, Coos Bay, Oregon 97420
Location of Borehole: 14' S, 23' W of SE Building Corner
Date Drilled: 10/10/2024
Logged By: Greg Thibeaux, P.E.

Report Number: 10-242116-1
Drilling Contractor: Holt Services
Drilling Method: Mud Rotary
Drilling Equipment: B-58 Truck Mounted Drill Rig
Ground Surface Elevation (ft msl): 77

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Sampling Data: Blows per 6 Inches	Sampling Data: N_{60}-Value	Sampling Data: % Passing #200 Sieve	Sampling Data: Liquid Limit	Sampling Data: Plastic Limit	Sampling Data: Moisture Content (%)	Remarks
26			**SANDY SILT (ML)** - mottled gray with orange, moist, stiff to hard.	SPT-6	9 16 37	72				27	
28											
30			**SILTY SAND (SM)** - gray, moist, dense and very dense.	SPT-7	29 40 50	122				2	
32											
34											
36				SPT-8	13 19 21	54				27	
38											
40			**SILT WITH SAND (ML)** - gray, moist, hard.	SPT-9	18 33 38	97	78			21	
42											
44											
46			**SILTY SAND (SM)** - gray, moist, very dense.	SPT-10	15 26 40	90	41			50	
48											
50											

Notes: Boring terminated in hard SILT (ML), at a depth of approximately 51.5 feet below the ground surface (bgs). Depth to groundwater indeterminate due to mud rotary drilling method. Boring backfilled with bentonite chips on 10/10/2024. Approximate elevation interpolated from Google Earth imagery dated 4/26/2023. Drill rig equipped with SPT auto-hammer. Energy ratio of 1.36 (i.e. 81.6/60 = 1.36) based on measured efficiency of 81.6 percent. Hammer energy efficiency based on report entitled "Energy Measurements for Dynamic Penetrometers", by Shannon & Wilson, dated 1/10/2024. *Lat. = 43.36475, Long. = -124.19599

Appendix A: Boring B-1

EARTH ENGINEERS
An RMA Company

Client: HGE Architects, Inc.
Project: Eastside Fire Station #3 Improvements
Site Address: 365 D Street, Coos Bay, Oregon 97420
Location of Borehole: 14' S, 23' W of SE Building Corner
Date Drilled: 10/10/2024
Logged By: Greg Thibeaux, P.E.

Report Number: 10-242116-1
Drilling Contractor: Holt Services
Drilling Method: Mud Rotary
Drilling Equipment: B-58 Truck Mounted Drill Rig
Ground Surface Elevation (ft msl): 77

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Blows per 6 Inches	N_{60}-Value (0 50 100)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Moisture Content (%)	Remarks
50			**SILT (ML)** - gray, wet, hard.	SPT-11	11 13 20	45	93			26	

Notes: Boring terminated in hard SILT (ML), at a depth of approximately 51.5 feet below the ground surface (bgs). Depth to groundwater indeterminate due to mud rotary drilling method. Boring backfilled with bentonite chips on 10/10/2024. Approximate elevation interpolated from Google Earth imagery dated 4/26/2023. Drill rig equipped with SPT auto-hammer. Energy ratio of 1.36 (i.e. 81.6/60 = 1.36) based on measured efficiency of 81.6 percent. Hammer energy efficiency based on report entitled "Energy Measurements for Dynamic Penetrometers", by Shannon & Wilson, dated 1/10/2024. *Lat. = 43.36475, Long. = -124.19599

Appendix A: Boring B-2

EARTH ENGINEERS
An RMA Company

Client: HGE Architects, Inc.
Project: Eastside Fire Station #3 Improvements
Site Address: 365 D Street, Coos Bay, Oregon 97420
Location of Borehole*: 12' N, 15" W of NE Building Corner
Date Drilled: 10/10/2024
Logged By: Greg Thibeaux, P.E.

Report Number: 10-242116-1
Drilling Contractor: Holt Services
Drilling Method: Mud Rotary
Drilling Equipment: B-58 Truck Mounted Drill Rig
Ground Surface Elevation (ft msl): 76

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Blows per 6 Inches	N_{60}-Value	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Moisture Content (%)	Remarks
0			**ASPHALT PAVEMENT** - approximately 6 inches thick.								Surface repaired with non-shrink grout to approximately existing grade.
			FILL - mixed, yellow-brown and dark brown, moist, silty clay fill soil, soft/medium stiff.	SPT-1	4 2 3	7					
2				SPT-2	1 1 3	5					
4				SPT-3	1 1 3	5					
6				SPT-4	1 1 2	4					
8											
10			**SANDY SILT (ML)** - mottled gray with orange, moist, soft to stiff.	SPT-5	1 1 2	4					
12											
14				SPT-6	2 5 7	16				66	
16											
18											
20	▼			SPT-7	4 6 9	20	54			62	
22											
24											

Notes: Boring terminated in hard SILT (ML), at a depth of approximately 51.5 feet below the ground surface (bgs). Groundwater measured in bore hole at 20 feet bgs, 14 hours after completion. Boring backfilled with bentonite chips on 10/10/2024. Approximate elevation interpolated from Google Earth imagery dated 4/26/2023. Drill rig equipped with SPT auto-hammer. Energy ratio of 1.36 (i.e. 81.6/60 = 1.36) based on measured efficiency of 81.6 percent. Hammer energy efficiency based on report entitled "Energy Measurements for Dynamic Penetrometers", by Shannon & Wilson, dated 1/10/2024. *Lat. = 43.36494, Long. = -124.19599

Appendix A: Boring B-2

EARTH ENGINEERS
An RMA Company

Client: HGE Architects, Inc.
Project: Eastside Fire Station #3 Improvements
Site Address: 365 D Street, Coos Bay, Oregon 97420
Location of Borehole*: 12' N, 15" W of NE Building Corner
Date Drilled: 10/10/2024
Logged By: Greg Thibeaux, P.E.

Report Number: 10-242116-1
Drilling Contractor: Holt Services
Drilling Method: Mud Rotary
Drilling Equipment: B-58 Truck Mounted Drill Rig
Ground Surface Elevation (ft msl): 76

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Blows per 6 Inches	N_{60}-Value	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Moisture Content (%)	Remarks
26			**SANDY SILT (ML)** - mottled gray with orange, moist, soft to stiff.	SPT-8	2 5 7	16	37			62	
28											
30			**SILTY SAND (SM)** - gray, moist, medium dense.	SPT-9	3 5 5	14	64			52	
32											
34											
36				SPT-10	5 8 10	24	51			45	
38											
40			**SILT WITH SAND (ML)** - gray, moist, hard.	SPT-11	6 9 13	30					
42											
44											
46			**SILTY SAND (SM)** - gray, moist, very dense.	SPT-12	5 13 26	53					
48											
50											

Notes: Boring terminated in hard SILT (ML), at a depth of approximately 51.5 feet below the ground surface (bgs). Groundwater measured in bore hole at 20 feet bgs, 14 hours after completion. Boring backfilled with bentonite chips on 10/10/2024. Approximate elevation interpolated from Google Earth imagery dated 4/26/2023. Drill rig equipped with SPT auto-hammer. Energy ratio of 1.36 (i.e. 81.6/60 = 1.36) based on measured efficiency of 81.6 percent. Hammer energy efficiency based on report entitled "Energy Measurements for Dynamic Penetrometers", by Shannon & Wilson, dated 1/10/2024. *Lat. = 43.36494, Long. = -124.19599

Appendix A: Boring B-2

EARTH ENGINEERS
An RMA Company

Client: HGE Architects, Inc.
Project: Eastside Fire Station #3 Improvements
Site Address: 365 D Street, Coos Bay, Oregon 97420
Location of Borehole*: 12' N, 15" W of NE Building Corner
Date Drilled: 10/10/2024
Logged By: Greg Thibeaux, P.E.

Report Number: 10-242116-1
Drilling Contractor: Holt Services
Drilling Method: Mud Rotary
Drilling Equipment: B-58 Truck Mounted Drill Rig
Ground Surface Elevation (ft msl): 76

Depth (ft)	Water Level	Lithology: Lithologic Symbol	Lithology: Geologic Description of Soil and Rock Strata	Sampling Data: Sample Number	Blows per 6 Inches	N_{60}-Value (0 50 100)	% Passing #200 Sieve	Liquid Limit	Plastic Limit	Moisture Content (%)	Remarks
50			**SILT (ML)** - gray, wet, hard.	SPT-13	18 36 42	106				28	

Notes: Boring terminated in hard SILT (ML), at a depth of approximately 51.5 feet below the ground surface (bgs). Groundwater measured in bore hole at 20 feet bgs, 14 hours after completion. Boring backfilled with bentonite chips on 10/10/2024. Approximate elevation interpolated from Google Earth imagery dated 4/26/2023. Drill rig equipped with SPT auto-hammer. Energy ratio of 1.36 (i.e. 81.6/60 = 1.36) based on measured efficiency of 81.6 percent. Hammer energy efficiency based on report entitled "Energy Measurements for Dynamic Penetrometers", by Shannon & Wilson, dated 1/10/2024. *Lat. = 43.36494, Long. = -124.19599

APPENDIX B:
SOIL CLASSIFICATION LEGEND

SOIL CLASSIFICATION LEGEND

APPARENT CONSISTENCY OF COHESIVE SOILS (PECK, HANSON & THORNBURN 1974, AASHTO 1988)				
Descriptor	**SPT N_{60} (blows/foot)***	**Pocket Penetrometer, Qp (tsf)**	**Torvane (tsf)**	**Field Approximation**
Very Soft	< 2	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	2 – 4	0.25 – 0.50	0.12 – 0.25	Easily penetrated several inches by thumb
Medium Stiff	5 – 8	0.50 – 1.0	0.25 – 0.50	Penetrated several inches by thumb w/moderate effort
Stiff	9 – 15	1.0 – 2.0	0.50 – 1.0	Readily indented by thumbnail
Very Stiff	16 – 30	2.0 – 4.0	1.0 – 2.0	Indented by thumb but penetrated only with great effort
Hard	> 30	> 4.0	> 2.0	Indented by thumbnail with difficulty

* Using SPT N_{60} is considered a crude approximation for cohesive soils.

APPARENT DENSITY OF COHESIONLESS SOILS (AASHTO 1988)	
Descriptor	**SPT N_{60} Value (blows/foot)**
Very Loose	0 – 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

MOISTURE (ASTM D2488-06)	
Descriptor	**Criteria**
Dry	Absence of moisture, dusty, dry to the touch, well below optimum moisture content (per ASTM D698 or D1557)
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table, well above optimum moisture content (per ASTM D698 or D1557)

PERCENT OR PROPORTION OF SOILS (ASTM D2488-06)	
Descriptor	**Criteria**
Trace	Particles are present but estimated < 5%
Few	5 – 10%
Little	15 – 25%
Some	30 – 45%
Mostly	50 – 100%
Percentages are estimated to nearest 5% in the field. Use "about" unless percentages are based on laboratory testing.	

SOIL PARTICLE SIZE (ASTM D2488-06)	
Descriptor	**Size**
Boulder	> 12 inches
Cobble	3 to 12 inches
Gravel - Coarse Fine	¾ inch to 3 inches No. 4 sieve to ¾ inch
Sand - Coarse Medium Fine	No. 10 to No. 4 sieve (4.75mm) No. 40 to No. 10 sieve (2mm) No. 200 to No. 40 sieve (.425mm)
Silt and Clay ("fines")	Passing No. 200 sieve (0.075mm)

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2488)				
Major Division			**Group Symbol**	**Description**
Coarse Grained Soils (more than 50% retained on #200 sieve)	**Gravel** (50% or more retained on No. 4 sieve)	Clean Gravel	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with fines	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	Sand (> 50% passing No. 4 sieve)	Clean sand	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly-graded sands and gravelly sands, little or no fines
		Sand with fines	SM	Silty sands and sand-silt mixtures
			SC	Clayey sands and sand-clay mixtures
Fine Grained Soils (50% or more passing #200 sieve)	**Silt and Clay** (liquid limit < 50)		ML	Inorganic silts, rock flour and clayey silts
			CL	Inorganic clays of low-medium plasticity, gravelly, sandy & lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silt and Clay (liquid limit > 50)		MH	Inorganic silts and clayey silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

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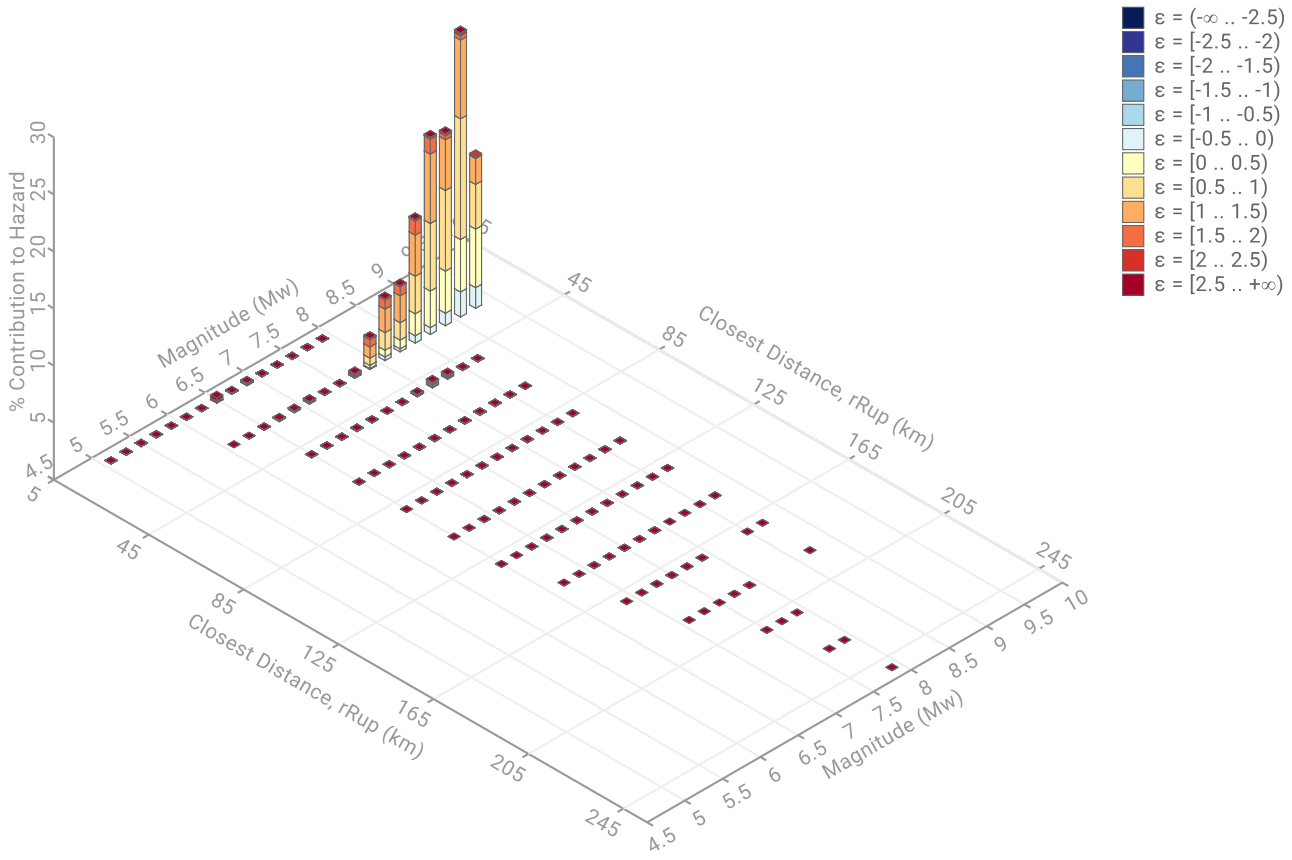
GRAPHIC SYMBOL LEGEND		
GRAB		Grab sample
SPT		Standard Penetration Test (2" OD), ASTM D1586
ST		Shelby Tube, ASTM D1587 (pushed)
DM		Dames and Moore ring sampler (3.25" OD and 140-pound hammer)
CORE		Rock coring

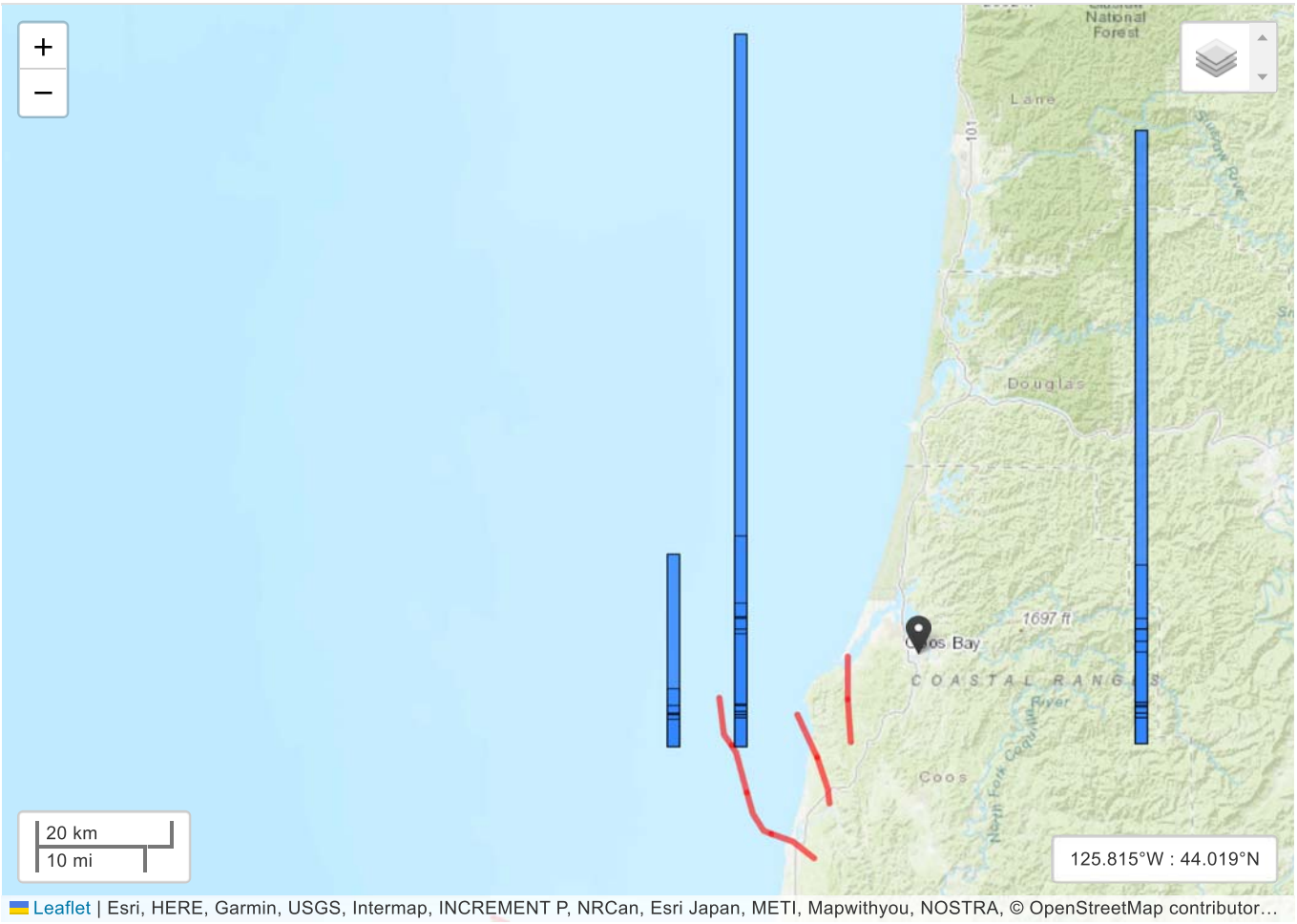
APPENDIX C:
SEISMIC HAZARD DEAGGRAGATION

Disaggregation Report

Disaggregation



Geographical Disaggregation



Parameter Summary

Model: NSHM Conterminous U.S. 2023

Latitude: 43.3648417 °

Longitude: -124.1960477 °

Site Class: D (Vs30 260)

Intensity Measure Type: PGA

Return Period: 2475 (2% in 50)

Component: Total

Application Metadata

Application: Disaggregation
URL: https://earthquake.usgs.gov/nshmp/hazard/disagg

Repository: nshmp-apps
Version: 4.7.2
URL: https://code.usgs.gov/ghsc/nshmp/nshmp-apps

Repository : nshmp-haz
Version: 2.4.17
URL: https://code.usgs.gov/ghsc/nshmp/nshmp-haz

Repository : nshmp-lib
Version: 1.4.27
URL: https://code.usgs.gov/ghsc/nshmp/nshmp-lib

Repository : nshmp-utils-java
Version: 0.4.0
URL: https://code.usgs.gov/ghsc/nshmp/nshmp-utils-java

Repository : nshm-conus
Version: 6.0.0
URL: https://code.usgs.gov/ghsc/nshmp/nshms/nshm-conus

*** Disaggregation of Seismic Hazard ***

Model: NSHM Conterminous U.S. 2023
Longitude: 124.196°W
Latitude: 43.365°N
IMT: PGA
Return Period: 2475 (2% in 50)
VS30: 260 m/s (D)

** Disaggregation Component: Total **

Disaggregation targets:
- Return period: 2475yrs
- Exceedance rate: 0.0004040404yr^{-1}
- PGA ground motion: 1.1246097g

Recovered targets:
- Return period: 2418.2135yrs
- Exceedance rate: 0.00041352841yr^{-1}

Totals:
- Binned: 100%
- Residual: 0%
- Trace: 0.49%

Mean (over all sources):
- m: 8.75
- r: 27.57km
- ε_0: 0.83σ

Mode (largest m-r bin):
- m: 9.05
- r: 28.05km
- ε_0: 0.74σ
- Contribution: 24.86%

Mode (largest m-r-ε_0 bin):
- m: 9.05
- r: 27.39km
- ε_0: 0.73σ
- Contribution: 10.58%

Discretization:
- r: min = 0.0, max = 1000.0, Δ = 20.0km
- m: min = 4.4, max = 9.4, Δ = 0.2
- ε: min = -3.0, max = 3.0, Δ = 0.5σ

Epsilon keys:
- ε0: [-∞ .. -2.5)
- ε1: [-2.5 .. -2.0)
- ε2: [-2.0 .. -1.5)
- ε3: [-1.5 .. -1.0)
- ε4: [-1.0 .. -0.5)
- ε5: [-0.5 .. 0.0)
- ε6: [0.0 .. 0.5)
- ε7: [0.5 .. 1.0)
- ε8: [1.0 .. 1.5)
- ε9: [1.5 .. 2.0)
- ε10: [2.0 .. 2.5)
- ε11: [2.5 .. +∞]

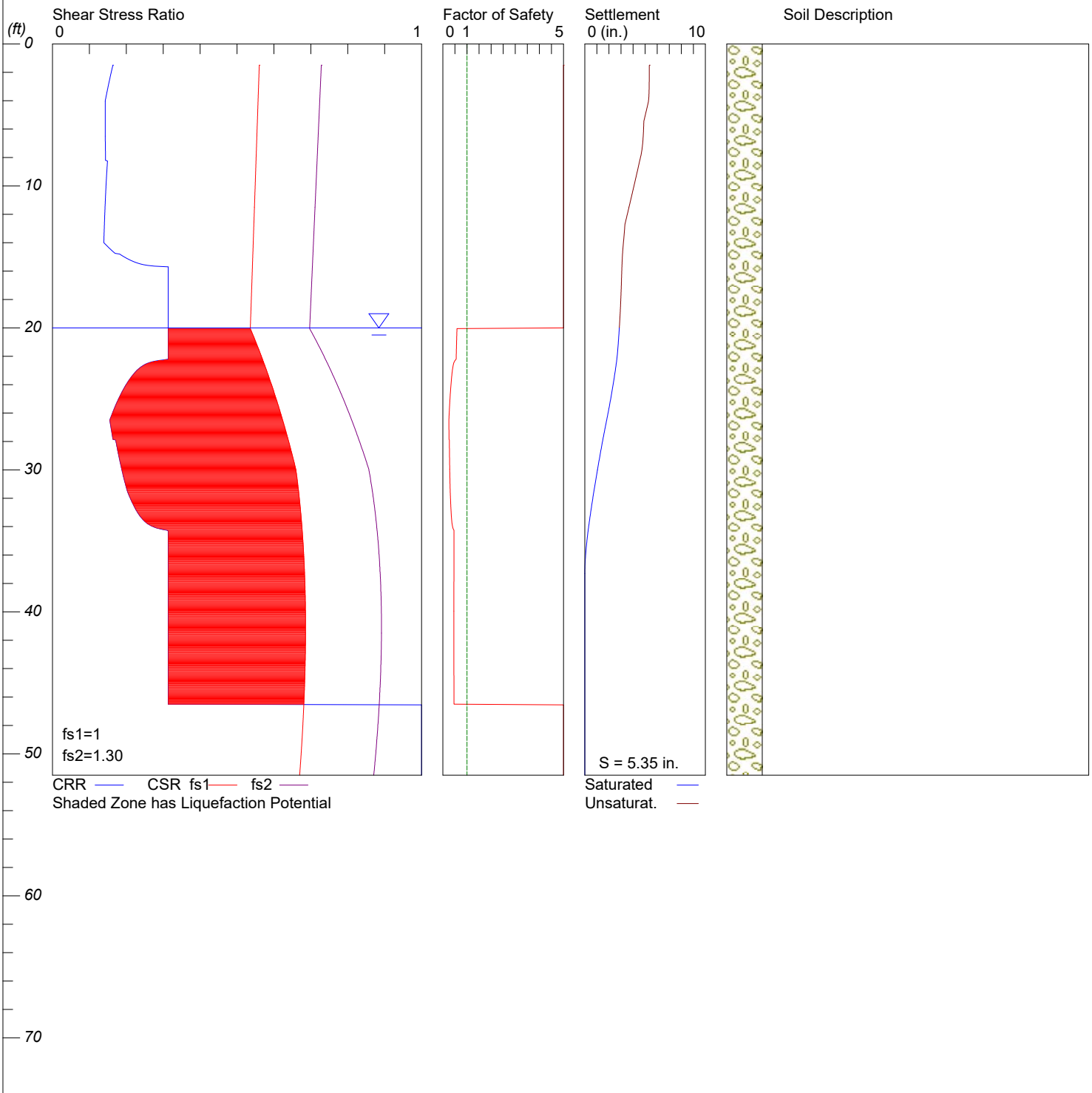
APPENDIX D:
LIQUEFY PRO OUTPUT

LIQUEFACTION ANALYSIS

Eastside Fire Station

Hole No.=B-2 Water Depth=20 ft Surface Elev.=77

Magnitude=9
Acceleration=0.865g



****
LIQUEFACTION ANALYSIS SUMMARY

****
Font: Courier New, Regular, Size 8 is recommended for this report.
Licensed to , 11/7/2024 11:42:21 AM

Input File Name: C:\Users\Greg Thibeaux\OneDrive - Earth-Engineers\Desktop\CURRENT PROJECTS\10-242116-1 FINAL.liq
Title: Eastside Fire Station
Subtitle: 10-242116-1

Surface Elev.=77
Hole No.=B-2
Depth of Hole= 51.50 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration= 0.87 g
Earthquake Magnitude= 9.00

Input Data:
Surface Elev.=77
Hole No.=B-2
Depth of Hole=51.50 ft
Water Table during Earthquake= 20.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration=0.87 g
Earthquake Magnitude=9.00
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot two CSR (fs1=1, fs2=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
1.50	7.00	90.00	72.00
4.00	5.00	90.00	72.00
6.50	5.00	90.00	72.00
9.00	4.00	90.00	72.00
11.50	4.00	90.00	72.00
14.00	4.00	90.00	72.00
16.50	16.00	110.00	72.00
21.50	20.00	110.00	54.00
26.50	16.00	110.00	37.00
31.50	14.00	110.00	64.00
36.50	24.00	110.00	51.00
41.50	30.00	110.00	78.00
46.50	53.00	110.00	NoLiq
51.50	106.00	110.00	NoLiq

Output Results:

Settlement of Saturated Sands=2.86 in.
Settlement of Unsaturated Sands=2.49 in.
Total Settlement of Saturated and Unsaturated Sands=5.35 in.
Differential Settlement=2.67 to 3.53 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
1.50	0.16	0.56	5.00	2.86	2.49	5.35
1.55	0.16	0.56	5.00	2.86	2.49	5.35
1.60	0.16	0.56	5.00	2.86	2.49	5.35
1.65	0.16	0.56	5.00	2.86	2.49	5.35
1.70	0.16	0.56	5.00	2.86	2.49	5.35
1.75	0.16	0.56	5.00	2.86	2.49	5.35
1.80	0.16	0.56	5.00	2.86	2.49	5.35
1.85	0.16	0.56	5.00	2.86	2.49	5.35
1.90	0.16	0.56	5.00	2.86	2.49	5.35
1.95	0.16	0.56	5.00	2.86	2.49	5.35
2.00	0.16	0.56	5.00	2.86	2.49	5.34
2.05	0.16	0.56	5.00	2.86	2.49	5.34
2.10	0.16	0.56	5.00	2.86	2.49	5.34
2.15	0.16	0.56	5.00	2.86	2.49	5.34
2.20	0.16	0.56	5.00	2.86	2.49	5.34
2.25	0.16	0.56	5.00	2.86	2.49	5.34
2.30	0.16	0.56	5.00	2.86	2.49	5.34
2.35	0.16	0.56	5.00	2.86	2.49	5.34
2.40	0.16	0.56	5.00	2.86	2.49	5.34
2.45	0.16	0.56	5.00	2.86	2.48	5.34
2.50	0.15	0.56	5.00	2.86	2.48	5.34
2.55	0.15	0.56	5.00	2.86	2.48	5.34

2.60	0.15	0.56	5.00	2.86	2.48	5.34
2.65	0.15	0.56	5.00	2.86	2.48	5.34
2.70	0.15	0.56	5.00	2.86	2.48	5.34
2.75	0.15	0.56	5.00	2.86	2.48	5.34
2.80	0.15	0.56	5.00	2.86	2.48	5.34
2.85	0.15	0.56	5.00	2.86	2.48	5.34
2.90	0.15	0.56	5.00	2.86	2.48	5.34
2.95	0.15	0.56	5.00	2.86	2.48	5.33
3.00	0.15	0.56	5.00	2.86	2.48	5.33
3.05	0.15	0.56	5.00	2.86	2.48	5.33
3.10	0.15	0.56	5.00	2.86	2.48	5.33
3.15	0.15	0.56	5.00	2.86	2.48	5.33
3.20	0.15	0.56	5.00	2.86	2.47	5.33
3.25	0.15	0.56	5.00	2.86	2.47	5.33
3.30	0.15	0.56	5.00	2.86	2.47	5.33
3.35	0.15	0.56	5.00	2.86	2.47	5.33
3.40	0.15	0.56	5.00	2.86	2.47	5.32
3.45	0.15	0.56	5.00	2.86	2.47	5.32
3.50	0.15	0.56	5.00	2.86	2.46	5.32
3.55	0.15	0.56	5.00	2.86	2.46	5.32
3.60	0.15	0.56	5.00	2.86	2.46	5.32
3.65	0.15	0.56	5.00	2.86	2.46	5.31
3.70	0.15	0.56	5.00	2.86	2.45	5.31
3.75	0.14	0.56	5.00	2.86	2.45	5.31
3.80	0.14	0.56	5.00	2.86	2.45	5.30
3.85	0.14	0.56	5.00	2.86	2.44	5.30
3.90	0.14	0.56	5.00	2.86	2.44	5.29
3.95	0.14	0.56	5.00	2.86	2.43	5.29
4.00	0.14	0.56	5.00	2.86	2.42	5.28
4.05	0.14	0.56	5.00	2.86	2.41	5.27
4.10	0.14	0.56	5.00	2.86	2.40	5.26
4.15	0.14	0.56	5.00	2.86	2.39	5.25
4.20	0.14	0.56	5.00	2.86	2.38	5.24
4.25	0.14	0.56	5.00	2.86	2.37	5.22
4.30	0.14	0.56	5.00	2.86	2.35	5.21
4.35	0.14	0.56	5.00	2.86	2.34	5.20
4.40	0.14	0.56	5.00	2.86	2.33	5.18
4.45	0.14	0.56	5.00	2.86	2.31	5.17
4.50	0.14	0.56	5.00	2.86	2.30	5.15
4.55	0.14	0.56	5.00	2.86	2.28	5.14
4.60	0.14	0.56	5.00	2.86	2.27	5.13
4.65	0.14	0.56	5.00	2.86	2.26	5.11
4.70	0.14	0.56	5.00	2.86	2.24	5.10
4.75	0.14	0.56	5.00	2.86	2.23	5.09
4.80	0.14	0.56	5.00	2.86	2.22	5.07
4.85	0.14	0.56	5.00	2.86	2.20	5.06
4.90	0.14	0.56	5.00	2.86	2.19	5.04
4.95	0.14	0.56	5.00	2.86	2.17	5.03
5.00	0.14	0.56	5.00	2.86	2.16	5.02
5.05	0.14	0.56	5.00	2.86	2.15	5.00

5.10	0.14	0.56	5.00	2.86	2.13	4.99
5.15	0.14	0.56	5.00	2.86	2.12	4.97
5.20	0.14	0.56	5.00	2.86	2.10	4.96
5.25	0.14	0.56	5.00	2.86	2.09	4.95
5.30	0.14	0.56	5.00	2.86	2.08	4.93
5.35	0.14	0.56	5.00	2.86	2.06	4.92
5.40	0.14	0.56	5.00	2.86	2.05	4.91
5.45	0.14	0.56	5.00	2.86	2.04	4.89
5.50	0.14	0.56	5.00	2.86	2.03	4.89
5.55	0.14	0.55	5.00	2.86	2.03	4.89
5.60	0.14	0.55	5.00	2.86	2.03	4.89
5.65	0.14	0.55	5.00	2.86	2.03	4.88
5.70	0.14	0.55	5.00	2.86	2.03	4.88
5.75	0.14	0.55	5.00	2.86	2.02	4.88
5.80	0.14	0.55	5.00	2.86	2.02	4.88
5.85	0.14	0.55	5.00	2.86	2.02	4.88
5.90	0.14	0.55	5.00	2.86	2.02	4.87
5.95	0.14	0.55	5.00	2.86	2.02	4.87
6.00	0.14	0.55	5.00	2.86	2.01	4.87
6.05	0.14	0.55	5.00	2.86	2.01	4.87
6.10	0.14	0.55	5.00	2.86	2.01	4.86
6.15	0.14	0.55	5.00	2.86	2.01	4.86
6.20	0.14	0.55	5.00	2.86	2.00	4.86
6.25	0.14	0.55	5.00	2.86	2.00	4.86
6.30	0.14	0.55	5.00	2.86	2.00	4.85
6.35	0.14	0.55	5.00	2.86	1.99	4.85
6.40	0.14	0.55	5.00	2.86	1.99	4.85
6.45	0.14	0.55	5.00	2.86	1.99	4.84
6.50	0.14	0.55	5.00	2.86	1.98	4.84
6.55	0.14	0.55	5.00	2.86	1.98	4.84
6.60	0.14	0.55	5.00	2.86	1.98	4.83
6.65	0.14	0.55	5.00	2.86	1.97	4.83
6.70	0.14	0.55	5.00	2.86	1.97	4.82
6.75	0.14	0.55	5.00	2.86	1.96	4.82
6.80	0.14	0.55	5.00	2.86	1.96	4.82
6.85	0.14	0.55	5.00	2.86	1.95	4.81
6.90	0.14	0.55	5.00	2.86	1.95	4.81
6.95	0.14	0.55	5.00	2.86	1.94	4.80
7.00	0.14	0.55	5.00	2.86	1.94	4.80
7.05	0.14	0.55	5.00	2.86	1.93	4.79
7.10	0.14	0.55	5.00	2.86	1.93	4.78
7.15	0.14	0.55	5.00	2.86	1.92	4.78
7.20	0.14	0.55	5.00	2.86	1.92	4.77
7.25	0.14	0.55	5.00	2.86	1.91	4.76
7.30	0.14	0.55	5.00	2.86	1.90	4.76
7.35	0.14	0.55	5.00	2.86	1.89	4.75
7.40	0.14	0.55	5.00	2.86	1.89	4.74
7.45	0.14	0.55	5.00	2.86	1.88	4.73
7.50	0.14	0.55	5.00	2.86	1.87	4.73
7.55	0.14	0.55	5.00	2.86	1.86	4.72

7.60	0.14	0.55	5.00	2.86	1.85	4.71
7.65	0.14	0.55	5.00	2.86	1.84	4.70
7.70	0.14	0.55	5.00	2.86	1.83	4.69
7.75	0.14	0.55	5.00	2.86	1.82	4.68
7.80	0.14	0.55	5.00	2.86	1.81	4.66
7.85	0.14	0.55	5.00	2.86	1.80	4.65
7.90	0.14	0.55	5.00	2.86	1.78	4.64
7.95	0.14	0.55	5.00	2.86	1.77	4.63
8.00	0.14	0.55	5.00	2.86	1.76	4.61
8.05	0.14	0.55	5.00	2.86	1.74	4.60
8.10	0.14	0.55	5.00	2.86	1.73	4.59
8.15	0.14	0.55	5.00	2.86	1.72	4.57
8.20	0.14	0.55	5.00	2.86	1.70	4.56
8.25	0.15	0.55	5.00	2.86	1.69	4.54
8.30	0.15	0.55	5.00	2.86	1.67	4.53
8.35	0.15	0.55	5.00	2.86	1.66	4.52
8.40	0.15	0.55	5.00	2.86	1.65	4.50
8.45	0.15	0.55	5.00	2.86	1.64	4.49
8.50	0.15	0.55	5.00	2.86	1.62	4.48
8.55	0.15	0.55	5.00	2.86	1.61	4.46
8.60	0.15	0.55	5.00	2.86	1.60	4.45
8.65	0.15	0.55	5.00	2.86	1.58	4.44
8.70	0.15	0.55	5.00	2.86	1.57	4.42
8.75	0.15	0.55	5.00	2.86	1.56	4.41
8.80	0.15	0.55	5.00	2.86	1.54	4.40
8.85	0.15	0.55	5.00	2.86	1.53	4.38
8.90	0.15	0.55	5.00	2.86	1.52	4.37
8.95	0.15	0.55	5.00	2.86	1.50	4.36
9.00	0.15	0.55	5.00	2.86	1.49	4.34
9.05	0.15	0.55	5.00	2.86	1.48	4.33
9.10	0.15	0.55	5.00	2.86	1.46	4.32
9.15	0.15	0.55	5.00	2.86	1.45	4.30
9.20	0.15	0.55	5.00	2.86	1.44	4.29
9.25	0.15	0.55	5.00	2.86	1.42	4.28
9.30	0.15	0.55	5.00	2.86	1.41	4.26
9.35	0.15	0.55	5.00	2.86	1.39	4.25
9.40	0.15	0.55	5.00	2.86	1.38	4.24
9.45	0.15	0.55	5.00	2.86	1.37	4.22
9.50	0.15	0.55	5.00	2.86	1.35	4.21
9.55	0.15	0.55	5.00	2.86	1.34	4.20
9.60	0.15	0.55	5.00	2.86	1.33	4.18
9.65	0.15	0.55	5.00	2.86	1.31	4.17
9.70	0.15	0.55	5.00	2.86	1.30	4.16
9.75	0.15	0.55	5.00	2.86	1.29	4.14
9.80	0.15	0.55	5.00	2.86	1.27	4.13
9.85	0.15	0.55	5.00	2.86	1.26	4.12
9.90	0.15	0.55	5.00	2.86	1.25	4.10
9.95	0.15	0.55	5.00	2.86	1.23	4.09
10.00	0.15	0.55	5.00	2.86	1.22	4.07
10.05	0.14	0.55	5.00	2.86	1.21	4.06

10.10	0.14	0.55	5.00	2.86	1.19	4.05
10.15	0.14	0.55	5.00	2.86	1.18	4.03
10.20	0.14	0.55	5.00	2.86	1.16	4.02
10.25	0.14	0.55	5.00	2.86	1.15	4.01
10.30	0.14	0.55	5.00	2.86	1.14	3.99
10.35	0.14	0.55	5.00	2.86	1.12	3.98
10.40	0.14	0.55	5.00	2.86	1.11	3.97
10.45	0.14	0.55	5.00	2.86	1.10	3.95
10.50	0.14	0.55	5.00	2.86	1.08	3.94
10.55	0.14	0.55	5.00	2.86	1.07	3.92
10.60	0.14	0.55	5.00	2.86	1.05	3.91
10.65	0.14	0.55	5.00	2.86	1.04	3.90
10.70	0.14	0.55	5.00	2.86	1.03	3.88
10.75	0.14	0.55	5.00	2.86	1.01	3.87
10.80	0.14	0.55	5.00	2.86	1.00	3.86
10.85	0.14	0.55	5.00	2.86	0.99	3.84
10.90	0.14	0.55	5.00	2.86	0.97	3.83
10.95	0.14	0.55	5.00	2.86	0.96	3.81
11.00	0.14	0.55	5.00	2.86	0.94	3.80
11.05	0.14	0.55	5.00	2.86	0.93	3.79
11.10	0.14	0.55	5.00	2.86	0.92	3.77
11.15	0.14	0.55	5.00	2.86	0.90	3.76
11.20	0.14	0.55	5.00	2.86	0.89	3.74
11.25	0.14	0.55	5.00	2.86	0.88	3.73
11.30	0.14	0.55	5.00	2.86	0.86	3.72
11.35	0.14	0.55	5.00	2.86	0.85	3.70
11.40	0.14	0.55	5.00	2.86	0.83	3.69
11.45	0.14	0.55	5.00	2.86	0.82	3.68
11.50	0.14	0.55	5.00	2.86	0.81	3.66
11.55	0.14	0.55	5.00	2.86	0.79	3.65
11.60	0.14	0.55	5.00	2.86	0.78	3.63
11.65	0.14	0.55	5.00	2.86	0.76	3.62
11.70	0.14	0.55	5.00	2.86	0.75	3.61
11.75	0.14	0.55	5.00	2.86	0.74	3.59
11.80	0.14	0.55	5.00	2.86	0.72	3.58
11.85	0.14	0.55	5.00	2.86	0.71	3.56
11.90	0.14	0.55	5.00	2.86	0.69	3.55
11.95	0.14	0.55	5.00	2.86	0.68	3.54
12.00	0.14	0.55	5.00	2.86	0.67	3.52
12.05	0.14	0.55	5.00	2.86	0.65	3.51
12.10	0.14	0.55	5.00	2.86	0.64	3.49
12.15	0.14	0.55	5.00	2.86	0.62	3.48
12.20	0.14	0.55	5.00	2.86	0.61	3.47
12.25	0.14	0.55	5.00	2.86	0.60	3.45
12.30	0.14	0.55	5.00	2.86	0.58	3.44
12.35	0.14	0.55	5.00	2.86	0.57	3.42
12.40	0.14	0.55	5.00	2.86	0.55	3.41
12.45	0.14	0.55	5.00	2.86	0.54	3.40
12.50	0.14	0.55	5.00	2.86	0.53	3.38
12.55	0.14	0.55	5.00	2.86	0.51	3.37

12.60	0.14	0.55	5.00	2.86	0.50	3.35
12.65	0.14	0.55	5.00	2.86	0.48	3.34
12.70	0.14	0.55	5.00	2.86	0.47	3.33
12.75	0.14	0.55	5.00	2.86	0.47	3.32
12.80	0.14	0.55	5.00	2.86	0.46	3.32
12.85	0.14	0.55	5.00	2.86	0.46	3.31
12.90	0.14	0.55	5.00	2.86	0.45	3.31
12.95	0.14	0.55	5.00	2.86	0.45	3.30
13.00	0.14	0.55	5.00	2.86	0.44	3.30
13.05	0.14	0.55	5.00	2.86	0.44	3.29
13.10	0.14	0.55	5.00	2.86	0.43	3.29
13.15	0.14	0.55	5.00	2.86	0.43	3.29
13.20	0.14	0.54	5.00	2.86	0.42	3.28
13.25	0.14	0.54	5.00	2.86	0.42	3.28
13.30	0.14	0.54	5.00	2.86	0.42	3.27
13.35	0.14	0.54	5.00	2.86	0.41	3.27
13.40	0.14	0.54	5.00	2.86	0.41	3.26
13.45	0.14	0.54	5.00	2.86	0.40	3.26
13.50	0.14	0.54	5.00	2.86	0.40	3.25
13.55	0.14	0.54	5.00	2.86	0.39	3.25
13.60	0.14	0.54	5.00	2.86	0.39	3.24
13.65	0.14	0.54	5.00	2.86	0.38	3.24
13.70	0.14	0.54	5.00	2.86	0.38	3.23
13.75	0.14	0.54	5.00	2.86	0.37	3.23
13.80	0.14	0.54	5.00	2.86	0.36	3.22
13.85	0.14	0.54	5.00	2.86	0.36	3.22
13.90	0.14	0.54	5.00	2.86	0.35	3.21
13.95	0.14	0.54	5.00	2.86	0.35	3.20
14.00	0.14	0.54	5.00	2.86	0.34	3.20
14.05	0.14	0.54	5.00	2.86	0.34	3.19
14.10	0.14	0.54	5.00	2.86	0.33	3.19
14.15	0.14	0.54	5.00	2.86	0.33	3.18
14.20	0.15	0.54	5.00	2.86	0.32	3.18
14.25	0.15	0.54	5.00	2.86	0.32	3.17
14.30	0.15	0.54	5.00	2.86	0.31	3.17
14.35	0.15	0.54	5.00	2.86	0.31	3.16
14.40	0.15	0.54	5.00	2.86	0.30	3.16
14.45	0.16	0.54	5.00	2.86	0.30	3.15
14.50	0.16	0.54	5.00	2.86	0.29	3.15
14.55	0.16	0.54	5.00	2.86	0.29	3.15
14.60	0.16	0.54	5.00	2.86	0.29	3.14
14.65	0.17	0.54	5.00	2.86	0.28	3.14
14.70	0.17	0.54	5.00	2.86	0.28	3.13
14.75	0.17	0.54	5.00	2.86	0.27	3.13
14.80	0.18	0.54	5.00	2.86	0.27	3.13
14.85	0.18	0.54	5.00	2.86	0.27	3.12
14.90	0.19	0.54	5.00	2.86	0.26	3.12
14.95	0.19	0.54	5.00	2.86	0.26	3.12
15.00	0.19	0.54	5.00	2.86	0.26	3.11
15.05	0.20	0.54	5.00	2.86	0.25	3.11

15.10	0.20	0.54	5.00	2.86	0.25	3.11
15.15	0.20	0.54	5.00	2.86	0.25	3.10
15.20	0.21	0.54	5.00	2.86	0.25	3.10
15.25	0.21	0.54	5.00	2.86	0.24	3.10
15.30	0.22	0.54	5.00	2.86	0.24	3.10
15.35	0.22	0.54	5.00	2.86	0.24	3.09
15.40	0.23	0.54	5.00	2.86	0.23	3.09
15.45	0.23	0.54	5.00	2.86	0.23	3.09
15.50	0.24	0.54	5.00	2.86	0.23	3.09
15.55	0.25	0.54	5.00	2.86	0.23	3.08
15.60	0.26	0.54	5.00	2.86	0.22	3.08
15.65	0.28	0.54	5.00	2.86	0.22	3.08
15.70	0.31	0.54	5.00	2.86	0.22	3.08
15.75	0.31	0.54	5.00	2.86	0.22	3.07
15.80	0.31	0.54	5.00	2.86	0.22	3.07
15.85	0.31	0.54	5.00	2.86	0.21	3.07
15.90	0.31	0.54	5.00	2.86	0.21	3.07
15.95	0.31	0.54	5.00	2.86	0.21	3.06
16.00	0.31	0.54	5.00	2.86	0.21	3.06
16.05	0.31	0.54	5.00	2.86	0.20	3.06
16.10	0.31	0.54	5.00	2.86	0.20	3.06
16.15	0.31	0.54	5.00	2.86	0.20	3.06
16.20	0.31	0.54	5.00	2.86	0.20	3.05
16.25	0.31	0.54	5.00	2.86	0.20	3.05
16.30	0.31	0.54	5.00	2.86	0.19	3.05
16.35	0.31	0.54	5.00	2.86	0.19	3.05
16.40	0.31	0.54	5.00	2.86	0.19	3.05
16.45	0.31	0.54	5.00	2.86	0.19	3.05
16.50	0.31	0.54	5.00	2.86	0.19	3.04
16.55	0.31	0.54	5.00	2.86	0.19	3.04
16.60	0.31	0.54	5.00	2.86	0.18	3.04
16.65	0.31	0.54	5.00	2.86	0.18	3.04
16.70	0.31	0.54	5.00	2.86	0.18	3.04
16.75	0.31	0.54	5.00	2.86	0.18	3.03
16.80	0.31	0.54	5.00	2.86	0.18	3.03
16.85	0.31	0.54	5.00	2.86	0.18	3.03
16.90	0.31	0.54	5.00	2.86	0.17	3.03
16.95	0.31	0.54	5.00	2.86	0.17	3.03
17.00	0.31	0.54	5.00	2.86	0.17	3.03
17.05	0.31	0.54	5.00	2.86	0.17	3.02
17.10	0.31	0.54	5.00	2.86	0.17	3.02
17.15	0.31	0.54	5.00	2.86	0.16	3.02
17.20	0.31	0.54	5.00	2.86	0.16	3.02
17.25	0.31	0.54	5.00	2.86	0.16	3.02
17.30	0.31	0.54	5.00	2.86	0.16	3.01
17.35	0.31	0.54	5.00	2.86	0.16	3.01
17.40	0.31	0.54	5.00	2.86	0.15	3.01
17.45	0.31	0.54	5.00	2.86	0.15	3.01
17.50	0.31	0.54	5.00	2.86	0.15	3.00
17.55	0.31	0.54	5.00	2.86	0.15	3.00

17.60	0.31	0.54	5.00	2.86	0.14	3.00
17.65	0.31	0.54	5.00	2.86	0.14	3.00
17.70	0.31	0.54	5.00	2.86	0.14	3.00
17.75	0.31	0.54	5.00	2.86	0.14	2.99
17.80	0.31	0.54	5.00	2.86	0.14	2.99
17.85	0.31	0.54	5.00	2.86	0.13	2.99
17.90	0.31	0.54	5.00	2.86	0.13	2.99
17.95	0.31	0.54	5.00	2.86	0.13	2.98
18.00	0.31	0.54	5.00	2.86	0.13	2.98
18.05	0.31	0.54	5.00	2.86	0.12	2.98
18.10	0.31	0.54	5.00	2.86	0.12	2.98
18.15	0.31	0.54	5.00	2.86	0.12	2.97
18.20	0.31	0.54	5.00	2.86	0.12	2.97
18.25	0.31	0.54	5.00	2.86	0.11	2.97
18.30	0.31	0.54	5.00	2.86	0.11	2.97
18.35	0.31	0.54	5.00	2.86	0.11	2.96
18.40	0.31	0.54	5.00	2.86	0.11	2.96
18.45	0.31	0.54	5.00	2.86	0.10	2.96
18.50	0.31	0.54	5.00	2.86	0.10	2.96
18.55	0.31	0.54	5.00	2.86	0.10	2.95
18.60	0.31	0.54	5.00	2.86	0.09	2.95
18.65	0.31	0.54	5.00	2.86	0.09	2.95
18.70	0.31	0.54	5.00	2.86	0.09	2.94
18.75	0.31	0.54	5.00	2.86	0.09	2.94
18.80	0.31	0.54	5.00	2.86	0.08	2.94
18.85	0.31	0.54	5.00	2.86	0.08	2.94
18.90	0.31	0.54	5.00	2.86	0.08	2.93
18.95	0.31	0.54	5.00	2.86	0.07	2.93
19.00	0.31	0.54	5.00	2.86	0.07	2.93
19.05	0.31	0.54	5.00	2.86	0.07	2.92
19.10	0.31	0.54	5.00	2.86	0.07	2.92
19.15	0.31	0.54	5.00	2.86	0.06	2.92
19.20	0.31	0.54	5.00	2.86	0.06	2.92
19.25	0.31	0.54	5.00	2.86	0.06	2.91
19.30	0.31	0.54	5.00	2.86	0.05	2.91
19.35	0.31	0.54	5.00	2.86	0.05	2.91
19.40	0.31	0.54	5.00	2.86	0.05	2.90
19.45	0.31	0.54	5.00	2.86	0.04	2.90
19.50	0.31	0.54	5.00	2.86	0.04	2.90
19.55	0.31	0.54	5.00	2.86	0.04	2.89
19.60	0.31	0.54	5.00	2.86	0.03	2.89
19.65	0.31	0.54	5.00	2.86	0.03	2.89
19.70	0.31	0.54	5.00	2.86	0.03	2.88
19.75	0.31	0.54	5.00	2.86	0.02	2.88
19.80	0.31	0.54	5.00	2.86	0.02	2.87
19.85	0.31	0.54	5.00	2.86	0.01	2.87
19.90	0.31	0.54	5.00	2.86	0.01	2.87
19.95	0.31	0.54	5.00	2.86	0.01	2.86
20.00	0.31	0.54	5.00	2.86	0.00	2.86
20.05	0.31	0.54	0.58*	2.86	0.00	2.86

20.10	0.31	0.54	0.58*	2.85	0.00	2.85
20.15	0.31	0.54	0.58*	2.85	0.00	2.85
20.20	0.31	0.54	0.58*	2.84	0.00	2.84
20.25	0.31	0.54	0.58*	2.84	0.00	2.84
20.30	0.31	0.54	0.58*	2.84	0.00	2.84
20.35	0.31	0.54	0.58*	2.83	0.00	2.83
20.40	0.31	0.54	0.58*	2.83	0.00	2.83
20.45	0.31	0.54	0.58*	2.82	0.00	2.82
20.50	0.31	0.54	0.58*	2.82	0.00	2.82
20.55	0.31	0.54	0.58*	2.82	0.00	2.82
20.60	0.31	0.54	0.58*	2.81	0.00	2.81
20.65	0.31	0.55	0.57*	2.81	0.00	2.81
20.70	0.31	0.55	0.57*	2.80	0.00	2.80
20.75	0.31	0.55	0.57*	2.80	0.00	2.80
20.80	0.31	0.55	0.57*	2.80	0.00	2.80
20.85	0.31	0.55	0.57*	2.79	0.00	2.79
20.90	0.31	0.55	0.57*	2.79	0.00	2.79
20.95	0.31	0.55	0.57*	2.78	0.00	2.78
21.00	0.31	0.55	0.57*	2.78	0.00	2.78
21.05	0.31	0.55	0.57*	2.78	0.00	2.78
21.10	0.31	0.55	0.57*	2.77	0.00	2.77
21.15	0.31	0.55	0.57*	2.77	0.00	2.77
21.20	0.31	0.55	0.57*	2.76	0.00	2.76
21.25	0.31	0.55	0.56*	2.76	0.00	2.76
21.30	0.31	0.56	0.56*	2.75	0.00	2.75
21.35	0.31	0.56	0.56*	2.75	0.00	2.75
21.40	0.31	0.56	0.56*	2.74	0.00	2.74
21.45	0.31	0.56	0.56*	2.74	0.00	2.74
21.50	0.31	0.56	0.56*	2.73	0.00	2.73
21.55	0.31	0.56	0.56*	2.73	0.00	2.73
21.60	0.31	0.56	0.56*	2.73	0.00	2.73
21.65	0.31	0.56	0.56*	2.72	0.00	2.72
21.70	0.31	0.56	0.56*	2.72	0.00	2.72
21.75	0.31	0.56	0.56*	2.71	0.00	2.71
21.80	0.31	0.56	0.56*	2.70	0.00	2.70
21.85	0.31	0.56	0.56*	2.70	0.00	2.70
21.90	0.31	0.56	0.56*	2.69	0.00	2.69
21.95	0.31	0.57	0.55*	2.69	0.00	2.69
22.00	0.31	0.57	0.55*	2.68	0.00	2.68
22.05	0.31	0.57	0.55*	2.67	0.00	2.67
22.10	0.31	0.57	0.55*	2.67	0.00	2.67
22.15	0.31	0.57	0.55*	2.66	0.00	2.66
22.20	0.31	0.57	0.55*	2.65	0.00	2.65
22.25	0.30	0.57	0.53*	2.65	0.00	2.65
22.30	0.29	0.57	0.50*	2.64	0.00	2.64
22.35	0.28	0.57	0.48*	2.63	0.00	2.63
22.40	0.27	0.57	0.47*	2.63	0.00	2.63
22.45	0.26	0.57	0.46*	2.62	0.00	2.62
22.50	0.26	0.57	0.45*	2.61	0.00	2.61
22.55	0.25	0.57	0.44*	2.60	0.00	2.60

22.60	0.25	0.57	0.43*	2.59	0.00	2.59
22.65	0.25	0.58	0.43*	2.58	0.00	2.58
22.70	0.24	0.58	0.42*	2.58	0.00	2.58
22.75	0.24	0.58	0.42*	2.57	0.00	2.57
22.80	0.24	0.58	0.41*	2.56	0.00	2.56
22.85	0.23	0.58	0.41*	2.55	0.00	2.55
22.90	0.23	0.58	0.40*	2.54	0.00	2.54
22.95	0.23	0.58	0.40*	2.53	0.00	2.53
23.00	0.23	0.58	0.39*	2.53	0.00	2.53
23.05	0.23	0.58	0.39*	2.52	0.00	2.52
23.10	0.22	0.58	0.39*	2.51	0.00	2.51
23.15	0.22	0.58	0.38*	2.50	0.00	2.50
23.20	0.22	0.58	0.38*	2.49	0.00	2.49
23.25	0.22	0.58	0.38*	2.48	0.00	2.48
23.30	0.22	0.58	0.37*	2.47	0.00	2.47
23.35	0.22	0.58	0.37*	2.46	0.00	2.46
23.40	0.22	0.59	0.37*	2.46	0.00	2.46
23.45	0.21	0.59	0.36*	2.45	0.00	2.45
23.50	0.21	0.59	0.36*	2.44	0.00	2.44
23.55	0.21	0.59	0.36*	2.43	0.00	2.43
23.60	0.21	0.59	0.36*	2.42	0.00	2.42
23.65	0.21	0.59	0.35*	2.41	0.00	2.41
23.70	0.21	0.59	0.35*	2.40	0.00	2.40
23.75	0.21	0.59	0.35*	2.39	0.00	2.39
23.80	0.20	0.59	0.35*	2.38	0.00	2.38
23.85	0.20	0.59	0.34*	2.37	0.00	2.37
23.90	0.20	0.59	0.34*	2.36	0.00	2.36
23.95	0.20	0.59	0.34*	2.35	0.00	2.35
24.00	0.20	0.59	0.34*	2.34	0.00	2.34
24.05	0.20	0.59	0.33*	2.33	0.00	2.33
24.10	0.20	0.59	0.33*	2.32	0.00	2.32
24.15	0.20	0.60	0.33*	2.32	0.00	2.32
24.20	0.19	0.60	0.33*	2.31	0.00	2.31
24.25	0.19	0.60	0.32*	2.30	0.00	2.30
24.30	0.19	0.60	0.32*	2.29	0.00	2.29
24.35	0.19	0.60	0.32*	2.28	0.00	2.28
24.40	0.19	0.60	0.32*	2.27	0.00	2.27
24.45	0.19	0.60	0.32*	2.26	0.00	2.26
24.50	0.19	0.60	0.31*	2.25	0.00	2.25
24.55	0.19	0.60	0.31*	2.24	0.00	2.24
24.60	0.19	0.60	0.31*	2.23	0.00	2.23
24.65	0.19	0.60	0.31*	2.22	0.00	2.22
24.70	0.18	0.60	0.31*	2.21	0.00	2.21
24.75	0.18	0.60	0.30*	2.20	0.00	2.20
24.80	0.18	0.60	0.30*	2.19	0.00	2.19
24.85	0.18	0.60	0.30*	2.18	0.00	2.18
24.90	0.18	0.60	0.30*	2.16	0.00	2.16
24.95	0.18	0.61	0.30*	2.15	0.00	2.15
25.00	0.18	0.61	0.30*	2.14	0.00	2.14
25.05	0.18	0.61	0.29*	2.13	0.00	2.13

25.10	0.18	0.61	0.29*	2.12	0.00	2.12
25.15	0.18	0.61	0.29*	2.11	0.00	2.11
25.20	0.18	0.61	0.29*	2.10	0.00	2.10
25.25	0.17	0.61	0.29*	2.09	0.00	2.09
25.30	0.17	0.61	0.28*	2.08	0.00	2.08
25.35	0.17	0.61	0.28*	2.07	0.00	2.07
25.40	0.17	0.61	0.28*	2.06	0.00	2.06
25.45	0.17	0.61	0.28*	2.05	0.00	2.05
25.50	0.17	0.61	0.28*	2.04	0.00	2.04
25.55	0.17	0.61	0.28*	2.03	0.00	2.03
25.60	0.17	0.61	0.27*	2.02	0.00	2.02
25.65	0.17	0.61	0.27*	2.00	0.00	2.00
25.70	0.17	0.61	0.27*	1.99	0.00	1.99
25.75	0.17	0.62	0.27*	1.98	0.00	1.98
25.80	0.17	0.62	0.27*	1.97	0.00	1.97
25.85	0.16	0.62	0.27*	1.96	0.00	1.96
25.90	0.16	0.62	0.27*	1.95	0.00	1.95
25.95	0.16	0.62	0.26*	1.94	0.00	1.94
26.00	0.16	0.62	0.26*	1.93	0.00	1.93
26.05	0.16	0.62	0.26*	1.91	0.00	1.91
26.10	0.16	0.62	0.26*	1.90	0.00	1.90
26.15	0.16	0.62	0.26*	1.89	0.00	1.89
26.20	0.16	0.62	0.26*	1.88	0.00	1.88
26.25	0.16	0.62	0.26*	1.87	0.00	1.87
26.30	0.16	0.62	0.25*	1.86	0.00	1.86
26.35	0.16	0.62	0.25*	1.85	0.00	1.85
26.40	0.16	0.62	0.25*	1.83	0.00	1.83
26.45	0.16	0.62	0.25*	1.82	0.00	1.82
26.50	0.16	0.62	0.25*	1.81	0.00	1.81
26.55	0.16	0.62	0.25*	1.80	0.00	1.80
26.60	0.16	0.62	0.25*	1.79	0.00	1.79
26.65	0.16	0.63	0.25*	1.78	0.00	1.78
26.70	0.16	0.63	0.25*	1.76	0.00	1.76
26.75	0.16	0.63	0.25*	1.75	0.00	1.75
26.80	0.16	0.63	0.25*	1.74	0.00	1.74
26.85	0.16	0.63	0.25*	1.73	0.00	1.73
26.90	0.16	0.63	0.25*	1.72	0.00	1.72
26.95	0.16	0.63	0.25*	1.71	0.00	1.71
27.00	0.16	0.63	0.25*	1.69	0.00	1.69
27.05	0.16	0.63	0.25*	1.68	0.00	1.68
27.10	0.16	0.63	0.25*	1.67	0.00	1.67
27.15	0.16	0.63	0.25*	1.66	0.00	1.66
27.20	0.16	0.63	0.25*	1.65	0.00	1.65
27.25	0.16	0.63	0.25*	1.64	0.00	1.64
27.30	0.16	0.63	0.25*	1.62	0.00	1.62
27.35	0.16	0.63	0.25*	1.61	0.00	1.61
27.40	0.16	0.63	0.25*	1.60	0.00	1.60
27.45	0.16	0.63	0.25*	1.59	0.00	1.59
27.50	0.16	0.63	0.25*	1.58	0.00	1.58
27.55	0.16	0.64	0.25*	1.57	0.00	1.57

27.60	0.16	0.64	0.26*	1.56	0.00	1.56
27.65	0.16	0.64	0.26*	1.54	0.00	1.54
27.70	0.16	0.64	0.26*	1.53	0.00	1.53
27.75	0.16	0.64	0.26*	1.52	0.00	1.52
27.80	0.16	0.64	0.26*	1.51	0.00	1.51
27.85	0.16	0.64	0.26*	1.50	0.00	1.50
27.90	0.17	0.64	0.27*	1.49	0.00	1.49
27.95	0.17	0.64	0.27*	1.48	0.00	1.48
28.00	0.17	0.64	0.27*	1.47	0.00	1.47
28.05	0.17	0.64	0.27*	1.46	0.00	1.46
28.10	0.17	0.64	0.27*	1.44	0.00	1.44
28.15	0.17	0.64	0.27*	1.43	0.00	1.43
28.20	0.17	0.64	0.27*	1.42	0.00	1.42
28.25	0.17	0.64	0.27*	1.41	0.00	1.41
28.30	0.17	0.64	0.27*	1.40	0.00	1.40
28.35	0.17	0.64	0.27*	1.39	0.00	1.39
28.40	0.17	0.64	0.27*	1.38	0.00	1.38
28.45	0.18	0.64	0.27*	1.37	0.00	1.37
28.50	0.18	0.65	0.27*	1.36	0.00	1.36
28.55	0.18	0.65	0.27*	1.35	0.00	1.35
28.60	0.18	0.65	0.27*	1.34	0.00	1.34
28.65	0.18	0.65	0.27*	1.33	0.00	1.33
28.70	0.18	0.65	0.27*	1.32	0.00	1.32
28.75	0.18	0.65	0.27*	1.31	0.00	1.31
28.80	0.18	0.65	0.27*	1.30	0.00	1.30
28.85	0.18	0.65	0.27*	1.29	0.00	1.29
28.90	0.18	0.65	0.28*	1.27	0.00	1.27
28.95	0.18	0.65	0.28*	1.26	0.00	1.26
29.00	0.18	0.65	0.28*	1.25	0.00	1.25
29.05	0.18	0.65	0.28*	1.24	0.00	1.24
29.10	0.18	0.65	0.28*	1.23	0.00	1.23
29.15	0.18	0.65	0.28*	1.22	0.00	1.22
29.20	0.18	0.65	0.28*	1.21	0.00	1.21
29.25	0.18	0.65	0.28*	1.20	0.00	1.20
29.30	0.18	0.65	0.28*	1.19	0.00	1.19
29.35	0.18	0.65	0.28*	1.18	0.00	1.18
29.40	0.18	0.65	0.28*	1.17	0.00	1.17
29.45	0.18	0.65	0.28*	1.16	0.00	1.16
29.50	0.18	0.65	0.28*	1.15	0.00	1.15
29.55	0.18	0.66	0.28*	1.14	0.00	1.14
29.60	0.18	0.66	0.28*	1.13	0.00	1.13
29.65	0.18	0.66	0.28*	1.12	0.00	1.12
29.70	0.19	0.66	0.28*	1.11	0.00	1.11
29.75	0.19	0.66	0.28*	1.10	0.00	1.10
29.80	0.19	0.66	0.28*	1.09	0.00	1.09
29.85	0.19	0.66	0.28*	1.08	0.00	1.08
29.90	0.19	0.66	0.28*	1.07	0.00	1.07
29.95	0.19	0.66	0.28*	1.06	0.00	1.06
30.00	0.19	0.66	0.28*	1.05	0.00	1.05
30.05	0.19	0.66	0.29*	1.04	0.00	1.04

30.10	0.19	0.66	0.29*	1.03	0.00	1.03
30.15	0.19	0.66	0.29*	1.02	0.00	1.02
30.20	0.19	0.66	0.29*	1.01	0.00	1.01
30.25	0.19	0.66	0.29*	1.00	0.00	1.00
30.30	0.19	0.66	0.29*	0.99	0.00	0.99
30.35	0.19	0.66	0.29*	0.98	0.00	0.98
30.40	0.19	0.66	0.29*	0.97	0.00	0.97
30.45	0.19	0.66	0.29*	0.96	0.00	0.96
30.50	0.19	0.66	0.29*	0.95	0.00	0.95
30.55	0.19	0.66	0.29*	0.94	0.00	0.94
30.60	0.19	0.66	0.29*	0.93	0.00	0.93
30.65	0.19	0.66	0.29*	0.92	0.00	0.92
30.70	0.19	0.66	0.29*	0.91	0.00	0.91
30.75	0.19	0.66	0.29*	0.90	0.00	0.90
30.80	0.20	0.66	0.29*	0.89	0.00	0.89
30.85	0.20	0.66	0.30*	0.88	0.00	0.88
30.90	0.20	0.66	0.30*	0.87	0.00	0.87
30.95	0.20	0.66	0.30*	0.86	0.00	0.86
31.00	0.20	0.66	0.30*	0.85	0.00	0.85
31.05	0.20	0.66	0.30*	0.84	0.00	0.84
31.10	0.20	0.66	0.30*	0.83	0.00	0.83
31.15	0.20	0.67	0.30*	0.82	0.00	0.82
31.20	0.20	0.67	0.30*	0.81	0.00	0.81
31.25	0.20	0.67	0.30*	0.80	0.00	0.80
31.30	0.20	0.67	0.30*	0.79	0.00	0.79
31.35	0.20	0.67	0.30*	0.78	0.00	0.78
31.40	0.20	0.67	0.30*	0.77	0.00	0.77
31.45	0.20	0.67	0.30*	0.76	0.00	0.76
31.50	0.20	0.67	0.30*	0.76	0.00	0.76
31.55	0.20	0.67	0.31*	0.75	0.00	0.75
31.60	0.20	0.67	0.31*	0.74	0.00	0.74
31.65	0.21	0.67	0.31*	0.73	0.00	0.73
31.70	0.21	0.67	0.31*	0.72	0.00	0.72
31.75	0.21	0.67	0.31*	0.71	0.00	0.71
31.80	0.21	0.67	0.31*	0.70	0.00	0.70
31.85	0.21	0.67	0.31*	0.69	0.00	0.69
31.90	0.21	0.67	0.31*	0.68	0.00	0.68
31.95	0.21	0.67	0.31*	0.67	0.00	0.67
32.00	0.21	0.67	0.32*	0.66	0.00	0.66
32.05	0.21	0.67	0.32*	0.65	0.00	0.65
32.10	0.21	0.67	0.32*	0.64	0.00	0.64
32.15	0.21	0.67	0.32*	0.63	0.00	0.63
32.20	0.21	0.67	0.32*	0.63	0.00	0.63
32.25	0.22	0.67	0.32*	0.62	0.00	0.62
32.30	0.22	0.67	0.32*	0.61	0.00	0.61
32.35	0.22	0.67	0.32*	0.60	0.00	0.60
32.40	0.22	0.67	0.32*	0.59	0.00	0.59
32.45	0.22	0.67	0.33*	0.58	0.00	0.58
32.50	0.22	0.67	0.33*	0.57	0.00	0.57
32.55	0.22	0.67	0.33*	0.56	0.00	0.56

32.60	0.22	0.67	0.33*	0.55	0.00	0.55
32.65	0.22	0.67	0.33*	0.55	0.00	0.55
32.70	0.22	0.67	0.33*	0.54	0.00	0.54
32.75	0.22	0.67	0.33*	0.53	0.00	0.53
32.80	0.23	0.67	0.34*	0.52	0.00	0.52
32.85	0.23	0.67	0.34*	0.51	0.00	0.51
32.90	0.23	0.67	0.34*	0.50	0.00	0.50
32.95	0.23	0.67	0.34*	0.49	0.00	0.49
33.00	0.23	0.67	0.34*	0.48	0.00	0.48
33.05	0.23	0.67	0.34*	0.48	0.00	0.48
33.10	0.23	0.67	0.35*	0.47	0.00	0.47
33.15	0.23	0.67	0.35*	0.46	0.00	0.46
33.20	0.24	0.67	0.35*	0.45	0.00	0.45
33.25	0.24	0.67	0.35*	0.44	0.00	0.44
33.30	0.24	0.67	0.35*	0.43	0.00	0.43
33.35	0.24	0.67	0.36*	0.42	0.00	0.42
33.40	0.24	0.67	0.36*	0.42	0.00	0.42
33.45	0.24	0.67	0.36*	0.41	0.00	0.41
33.50	0.24	0.67	0.36*	0.40	0.00	0.40
33.55	0.25	0.67	0.37*	0.39	0.00	0.39
33.60	0.25	0.67	0.37*	0.38	0.00	0.38
33.65	0.25	0.67	0.37*	0.38	0.00	0.38
33.70	0.25	0.67	0.37*	0.37	0.00	0.37
33.75	0.26	0.68	0.38*	0.36	0.00	0.36
33.80	0.26	0.68	0.38*	0.35	0.00	0.35
33.85	0.26	0.68	0.39*	0.34	0.00	0.34
33.90	0.26	0.68	0.39*	0.33	0.00	0.33
33.95	0.27	0.68	0.40*	0.33	0.00	0.33
34.00	0.27	0.68	0.40*	0.32	0.00	0.32
34.05	0.28	0.68	0.41*	0.31	0.00	0.31
34.10	0.28	0.68	0.42*	0.30	0.00	0.30
34.15	0.29	0.68	0.43*	0.29	0.00	0.29
34.20	0.30	0.68	0.44*	0.29	0.00	0.29
34.25	0.31	0.68	0.46*	0.28	0.00	0.28
34.30	0.31	0.68	0.46*	0.27	0.00	0.27
34.35	0.31	0.68	0.46*	0.26	0.00	0.26
34.40	0.31	0.68	0.46*	0.26	0.00	0.26
34.45	0.31	0.68	0.46*	0.25	0.00	0.25
34.50	0.31	0.68	0.46*	0.24	0.00	0.24
34.55	0.31	0.68	0.46*	0.23	0.00	0.23
34.60	0.31	0.68	0.46*	0.23	0.00	0.23
34.65	0.31	0.68	0.46*	0.22	0.00	0.22
34.70	0.31	0.68	0.46*	0.21	0.00	0.21
34.75	0.31	0.68	0.46*	0.21	0.00	0.21
34.80	0.31	0.68	0.46*	0.20	0.00	0.20
34.85	0.31	0.68	0.46*	0.19	0.00	0.19
34.90	0.31	0.68	0.46*	0.19	0.00	0.19
34.95	0.31	0.68	0.46*	0.18	0.00	0.18
35.00	0.31	0.68	0.46*	0.17	0.00	0.17
35.05	0.31	0.68	0.46*	0.17	0.00	0.17

35.10	0.31	0.68	0.46*	0.16	0.00	0.16
35.15	0.31	0.68	0.46*	0.16	0.00	0.16
35.20	0.31	0.68	0.46*	0.15	0.00	0.15
35.25	0.31	0.68	0.46*	0.14	0.00	0.14
35.30	0.31	0.68	0.46*	0.14	0.00	0.14
35.35	0.31	0.68	0.46*	0.13	0.00	0.13
35.40	0.31	0.68	0.46*	0.13	0.00	0.13
35.45	0.31	0.68	0.46*	0.12	0.00	0.12
35.50	0.31	0.68	0.46*	0.12	0.00	0.12
35.55	0.31	0.68	0.46*	0.11	0.00	0.11
35.60	0.31	0.68	0.46*	0.11	0.00	0.11
35.65	0.31	0.68	0.46*	0.10	0.00	0.10
35.70	0.31	0.68	0.46*	0.10	0.00	0.10
35.75	0.31	0.68	0.46*	0.09	0.00	0.09
35.80	0.31	0.68	0.46*	0.09	0.00	0.09
35.85	0.31	0.68	0.46*	0.08	0.00	0.08
35.90	0.31	0.68	0.46*	0.08	0.00	0.08
35.95	0.31	0.68	0.46*	0.07	0.00	0.07
36.00	0.31	0.68	0.46*	0.07	0.00	0.07
36.05	0.31	0.68	0.46*	0.06	0.00	0.06
36.10	0.31	0.68	0.46*	0.06	0.00	0.06
36.15	0.31	0.68	0.46*	0.06	0.00	0.06
36.20	0.31	0.68	0.46*	0.05	0.00	0.05
36.25	0.31	0.68	0.46*	0.05	0.00	0.05
36.30	0.31	0.68	0.46*	0.04	0.00	0.04
36.35	0.31	0.68	0.46*	0.04	0.00	0.04
36.40	0.31	0.68	0.46*	0.04	0.00	0.04
36.45	0.31	0.68	0.46*	0.03	0.00	0.03
36.50	0.31	0.68	0.46*	0.03	0.00	0.03
36.55	0.31	0.68	0.46*	0.03	0.00	0.03
36.60	0.31	0.68	0.46*	0.02	0.00	0.02
36.65	0.31	0.68	0.46*	0.02	0.00	0.02
36.70	0.31	0.68	0.46*	0.02	0.00	0.02
36.75	0.31	0.68	0.46*	0.01	0.00	0.01
36.80	0.31	0.68	0.46*	0.01	0.00	0.01
36.85	0.31	0.68	0.46*	0.01	0.00	0.01
36.90	0.31	0.68	0.46*	0.01	0.00	0.01
36.95	0.31	0.68	0.46*	0.01	0.00	0.01
37.00	0.31	0.68	0.46*	0.00	0.00	0.00
37.05	0.31	0.68	0.46*	0.00	0.00	0.00
37.10	0.31	0.68	0.46*	0.00	0.00	0.00
37.15	0.31	0.68	0.46*	0.00	0.00	0.00
37.20	0.31	0.68	0.46*	0.00	0.00	0.00
37.25	0.31	0.68	0.46*	0.00	0.00	0.00
37.30	0.31	0.68	0.46*	0.00	0.00	0.00
37.35	0.31	0.68	0.46*	0.00	0.00	0.00
37.40	0.31	0.68	0.46*	0.00	0.00	0.00
37.45	0.31	0.68	0.46*	0.00	0.00	0.00
37.50	0.31	0.68	0.46*	0.00	0.00	0.00
37.55	0.31	0.68	0.46*	0.00	0.00	0.00

37.60	0.31	0.68	0.46*	0.00	0.00	0.00
37.65	0.31	0.68	0.46*	0.00	0.00	0.00
37.70	0.31	0.68	0.46*	0.00	0.00	0.00
37.75	0.31	0.68	0.46*	0.00	0.00	0.00
37.80	0.31	0.68	0.46*	0.00	0.00	0.00
37.85	0.31	0.68	0.46*	0.00	0.00	0.00
37.90	0.31	0.68	0.46*	0.00	0.00	0.00
37.95	0.31	0.68	0.46*	0.00	0.00	0.00
38.00	0.31	0.68	0.46*	0.00	0.00	0.00
38.05	0.31	0.68	0.46*	0.00	0.00	0.00
38.10	0.31	0.68	0.46*	0.00	0.00	0.00
38.15	0.31	0.68	0.46*	0.00	0.00	0.00
38.20	0.31	0.68	0.46*	0.00	0.00	0.00
38.25	0.31	0.68	0.46*	0.00	0.00	0.00
38.30	0.31	0.68	0.46*	0.00	0.00	0.00
38.35	0.31	0.68	0.46*	0.00	0.00	0.00
38.40	0.31	0.68	0.46*	0.00	0.00	0.00
38.45	0.31	0.68	0.46*	0.00	0.00	0.00
38.50	0.31	0.68	0.46*	0.00	0.00	0.00
38.55	0.31	0.68	0.46*	0.00	0.00	0.00
38.60	0.31	0.68	0.46*	0.00	0.00	0.00
38.65	0.31	0.68	0.46*	0.00	0.00	0.00
38.70	0.31	0.68	0.46*	0.00	0.00	0.00
38.75	0.31	0.68	0.46*	0.00	0.00	0.00
38.80	0.31	0.68	0.46*	0.00	0.00	0.00
38.85	0.31	0.68	0.46*	0.00	0.00	0.00
38.90	0.31	0.68	0.46*	0.00	0.00	0.00
38.95	0.31	0.68	0.46*	0.00	0.00	0.00
39.00	0.31	0.68	0.46*	0.00	0.00	0.00
39.05	0.31	0.68	0.46*	0.00	0.00	0.00
39.10	0.31	0.68	0.46*	0.00	0.00	0.00
39.15	0.31	0.69	0.46*	0.00	0.00	0.00
39.20	0.31	0.69	0.46*	0.00	0.00	0.00
39.25	0.31	0.69	0.46*	0.00	0.00	0.00
39.30	0.31	0.69	0.46*	0.00	0.00	0.00
39.35	0.31	0.69	0.46*	0.00	0.00	0.00
39.40	0.31	0.69	0.46*	0.00	0.00	0.00
39.45	0.31	0.69	0.46*	0.00	0.00	0.00
39.50	0.31	0.69	0.46*	0.00	0.00	0.00
39.55	0.31	0.69	0.46*	0.00	0.00	0.00
39.60	0.31	0.69	0.46*	0.00	0.00	0.00
39.65	0.31	0.69	0.46*	0.00	0.00	0.00
39.70	0.31	0.69	0.46*	0.00	0.00	0.00
39.75	0.31	0.69	0.46*	0.00	0.00	0.00
39.80	0.31	0.69	0.46*	0.00	0.00	0.00
39.85	0.31	0.69	0.46*	0.00	0.00	0.00
39.90	0.31	0.69	0.46*	0.00	0.00	0.00
39.95	0.31	0.69	0.46*	0.00	0.00	0.00
40.00	0.31	0.69	0.46*	0.00	0.00	0.00
40.05	0.31	0.69	0.46*	0.00	0.00	0.00

40.10	0.31	0.69	0.46*	0.00	0.00	0.00
40.15	0.31	0.69	0.46*	0.00	0.00	0.00
40.20	0.31	0.69	0.46*	0.00	0.00	0.00
40.25	0.31	0.69	0.46*	0.00	0.00	0.00
40.30	0.31	0.69	0.46*	0.00	0.00	0.00
40.35	0.31	0.69	0.46*	0.00	0.00	0.00
40.40	0.31	0.69	0.46*	0.00	0.00	0.00
40.45	0.31	0.69	0.46*	0.00	0.00	0.00
40.50	0.31	0.69	0.46*	0.00	0.00	0.00
40.55	0.31	0.69	0.46*	0.00	0.00	0.00
40.60	0.31	0.69	0.46*	0.00	0.00	0.00
40.65	0.31	0.69	0.46*	0.00	0.00	0.00
40.70	0.31	0.69	0.46*	0.00	0.00	0.00
40.75	0.31	0.69	0.46*	0.00	0.00	0.00
40.80	0.31	0.69	0.46*	0.00	0.00	0.00
40.85	0.31	0.69	0.46*	0.00	0.00	0.00
40.90	0.31	0.69	0.46*	0.00	0.00	0.00
40.95	0.31	0.69	0.46*	0.00	0.00	0.00
41.00	0.31	0.69	0.46*	0.00	0.00	0.00
41.05	0.31	0.69	0.46*	0.00	0.00	0.00
41.10	0.31	0.69	0.46*	0.00	0.00	0.00
41.15	0.31	0.69	0.46*	0.00	0.00	0.00
41.20	0.31	0.69	0.46*	0.00	0.00	0.00
41.25	0.31	0.69	0.46*	0.00	0.00	0.00
41.30	0.31	0.69	0.46*	0.00	0.00	0.00
41.35	0.31	0.69	0.46*	0.00	0.00	0.00
41.40	0.31	0.69	0.46*	0.00	0.00	0.00
41.45	0.31	0.69	0.46*	0.00	0.00	0.00
41.50	0.31	0.69	0.46*	0.00	0.00	0.00
41.55	0.31	0.69	0.46*	0.00	0.00	0.00
41.60	0.31	0.69	0.46*	0.00	0.00	0.00
41.65	0.31	0.69	0.46*	0.00	0.00	0.00
41.70	0.31	0.69	0.46*	0.00	0.00	0.00
41.75	0.31	0.69	0.46*	0.00	0.00	0.00
41.80	0.31	0.69	0.46*	0.00	0.00	0.00
41.85	0.31	0.69	0.46*	0.00	0.00	0.00
41.90	0.31	0.69	0.46*	0.00	0.00	0.00
41.95	0.31	0.69	0.46*	0.00	0.00	0.00
42.00	0.31	0.69	0.46*	0.00	0.00	0.00
42.05	0.31	0.69	0.46*	0.00	0.00	0.00
42.10	0.31	0.69	0.46*	0.00	0.00	0.00
42.15	0.31	0.69	0.46*	0.00	0.00	0.00
42.20	0.31	0.69	0.46*	0.00	0.00	0.00
42.25	0.31	0.69	0.46*	0.00	0.00	0.00
42.30	0.31	0.69	0.46*	0.00	0.00	0.00
42.35	0.31	0.69	0.46*	0.00	0.00	0.00
42.40	0.31	0.69	0.46*	0.00	0.00	0.00
42.45	0.31	0.69	0.46*	0.00	0.00	0.00
42.50	0.31	0.69	0.46*	0.00	0.00	0.00
42.55	0.31	0.69	0.46*	0.00	0.00	0.00

42.60	0.31	0.69	0.46*	0.00	0.00	0.00
42.65	0.31	0.69	0.46*	0.00	0.00	0.00
42.70	0.31	0.69	0.46*	0.00	0.00	0.00
42.75	0.31	0.69	0.46*	0.00	0.00	0.00
42.80	0.31	0.69	0.46*	0.00	0.00	0.00
42.85	0.31	0.69	0.46*	0.00	0.00	0.00
42.90	0.31	0.69	0.46*	0.00	0.00	0.00
42.95	0.31	0.69	0.46*	0.00	0.00	0.00
43.00	0.31	0.69	0.46*	0.00	0.00	0.00
43.05	0.31	0.69	0.46*	0.00	0.00	0.00
43.10	0.31	0.69	0.46*	0.00	0.00	0.00
43.15	0.31	0.68	0.46*	0.00	0.00	0.00
43.20	0.31	0.68	0.46*	0.00	0.00	0.00
43.25	0.31	0.68	0.46*	0.00	0.00	0.00
43.30	0.31	0.68	0.46*	0.00	0.00	0.00
43.35	0.31	0.68	0.46*	0.00	0.00	0.00
43.40	0.31	0.68	0.46*	0.00	0.00	0.00
43.45	0.31	0.68	0.46*	0.00	0.00	0.00
43.50	0.31	0.68	0.46*	0.00	0.00	0.00
43.55	0.31	0.68	0.46*	0.00	0.00	0.00
43.60	0.31	0.68	0.46*	0.00	0.00	0.00
43.65	0.31	0.68	0.46*	0.00	0.00	0.00
43.70	0.31	0.68	0.46*	0.00	0.00	0.00
43.75	0.31	0.68	0.46*	0.00	0.00	0.00
43.80	0.31	0.68	0.46*	0.00	0.00	0.00
43.85	0.31	0.68	0.46*	0.00	0.00	0.00
43.90	0.31	0.68	0.46*	0.00	0.00	0.00
43.95	0.31	0.68	0.46*	0.00	0.00	0.00
44.00	0.31	0.68	0.46*	0.00	0.00	0.00
44.05	0.31	0.68	0.46*	0.00	0.00	0.00
44.10	0.31	0.68	0.46*	0.00	0.00	0.00
44.15	0.31	0.68	0.46*	0.00	0.00	0.00
44.20	0.31	0.68	0.46*	0.00	0.00	0.00
44.25	0.31	0.68	0.46*	0.00	0.00	0.00
44.30	0.31	0.68	0.46*	0.00	0.00	0.00
44.35	0.31	0.68	0.46*	0.00	0.00	0.00
44.40	0.31	0.68	0.46*	0.00	0.00	0.00
44.45	0.31	0.68	0.46*	0.00	0.00	0.00
44.50	0.31	0.68	0.46*	0.00	0.00	0.00
44.55	0.31	0.68	0.46*	0.00	0.00	0.00
44.60	0.31	0.68	0.46*	0.00	0.00	0.00
44.65	0.31	0.68	0.46*	0.00	0.00	0.00
44.70	0.31	0.68	0.46*	0.00	0.00	0.00
44.75	0.31	0.68	0.46*	0.00	0.00	0.00
44.80	0.31	0.68	0.46*	0.00	0.00	0.00
44.85	0.31	0.68	0.46*	0.00	0.00	0.00
44.90	0.31	0.68	0.46*	0.00	0.00	0.00
44.95	0.31	0.68	0.46*	0.00	0.00	0.00
45.00	0.31	0.68	0.46*	0.00	0.00	0.00
45.05	0.31	0.68	0.46*	0.00	0.00	0.00

45.10	0.31	0.68	0.46*	0.00	0.00	0.00
45.15	0.31	0.68	0.46*	0.00	0.00	0.00
45.20	0.31	0.68	0.46*	0.00	0.00	0.00
45.25	0.31	0.68	0.46*	0.00	0.00	0.00
45.30	0.31	0.68	0.46*	0.00	0.00	0.00
45.35	0.31	0.68	0.46*	0.00	0.00	0.00
45.40	0.31	0.68	0.46*	0.00	0.00	0.00
45.45	0.31	0.68	0.46*	0.00	0.00	0.00
45.50	0.31	0.68	0.46*	0.00	0.00	0.00
45.55	0.31	0.68	0.46*	0.00	0.00	0.00
45.60	0.31	0.68	0.46*	0.00	0.00	0.00
45.65	0.31	0.68	0.46*	0.00	0.00	0.00
45.70	0.31	0.68	0.46*	0.00	0.00	0.00
45.75	0.31	0.68	0.46*	0.00	0.00	0.00
45.80	0.31	0.68	0.46*	0.00	0.00	0.00
45.85	0.31	0.68	0.46*	0.00	0.00	0.00
45.90	0.31	0.68	0.46*	0.00	0.00	0.00
45.95	0.31	0.68	0.46*	0.00	0.00	0.00
46.00	0.31	0.68	0.46*	0.00	0.00	0.00
46.05	0.31	0.68	0.46*	0.00	0.00	0.00
46.10	0.31	0.68	0.46*	0.00	0.00	0.00
46.15	0.31	0.68	0.46*	0.00	0.00	0.00
46.20	0.31	0.68	0.46*	0.00	0.00	0.00
46.25	0.31	0.68	0.46*	0.00	0.00	0.00
46.30	0.31	0.68	0.46*	0.00	0.00	0.00
46.35	0.31	0.68	0.46*	0.00	0.00	0.00
46.40	0.31	0.68	0.46*	0.00	0.00	0.00
46.45	0.31	0.68	0.46*	0.00	0.00	0.00
46.50	0.31	0.68	0.46*	0.00	0.00	0.00
46.55	2.00	0.68	5.00	0.00	0.00	0.00
46.60	2.00	0.68	5.00	0.00	0.00	0.00
46.65	2.00	0.68	5.00	0.00	0.00	0.00
46.70	2.00	0.68	5.00	0.00	0.00	0.00
46.75	2.00	0.68	5.00	0.00	0.00	0.00
46.80	2.00	0.68	5.00	0.00	0.00	0.00
46.85	2.00	0.68	5.00	0.00	0.00	0.00
46.90	2.00	0.68	5.00	0.00	0.00	0.00
46.95	2.00	0.68	5.00	0.00	0.00	0.00
47.00	2.00	0.68	5.00	0.00	0.00	0.00
47.05	2.00	0.68	5.00	0.00	0.00	0.00
47.10	2.00	0.68	5.00	0.00	0.00	0.00
47.15	2.00	0.68	5.00	0.00	0.00	0.00
47.20	2.00	0.68	5.00	0.00	0.00	0.00
47.25	2.00	0.68	5.00	0.00	0.00	0.00
47.30	2.00	0.68	5.00	0.00	0.00	0.00
47.35	2.00	0.68	5.00	0.00	0.00	0.00
47.40	2.00	0.68	5.00	0.00	0.00	0.00
47.45	2.00	0.68	5.00	0.00	0.00	0.00
47.50	2.00	0.68	5.00	0.00	0.00	0.00
47.55	2.00	0.68	5.00	0.00	0.00	0.00

47.60	2.00	0.68	5.00	0.00	0.00	0.00
47.65	2.00	0.68	5.00	0.00	0.00	0.00
47.70	2.00	0.68	5.00	0.00	0.00	0.00
47.75	2.00	0.68	5.00	0.00	0.00	0.00
47.80	2.00	0.68	5.00	0.00	0.00	0.00
47.85	2.00	0.68	5.00	0.00	0.00	0.00
47.90	2.00	0.68	5.00	0.00	0.00	0.00
47.95	2.00	0.68	5.00	0.00	0.00	0.00
48.00	2.00	0.68	5.00	0.00	0.00	0.00
48.05	2.00	0.68	5.00	0.00	0.00	0.00
48.10	2.00	0.68	5.00	0.00	0.00	0.00
48.15	2.00	0.68	5.00	0.00	0.00	0.00
48.20	2.00	0.68	5.00	0.00	0.00	0.00
48.25	2.00	0.68	5.00	0.00	0.00	0.00
48.30	2.00	0.68	5.00	0.00	0.00	0.00
48.35	2.00	0.68	5.00	0.00	0.00	0.00
48.40	2.00	0.68	5.00	0.00	0.00	0.00
48.45	2.00	0.68	5.00	0.00	0.00	0.00
48.50	2.00	0.68	5.00	0.00	0.00	0.00
48.55	2.00	0.68	5.00	0.00	0.00	0.00
48.60	2.00	0.68	5.00	0.00	0.00	0.00
48.65	2.00	0.68	5.00	0.00	0.00	0.00
48.70	2.00	0.68	5.00	0.00	0.00	0.00
48.75	2.00	0.68	5.00	0.00	0.00	0.00
48.80	2.00	0.68	5.00	0.00	0.00	0.00
48.85	2.00	0.68	5.00	0.00	0.00	0.00
48.90	2.00	0.68	5.00	0.00	0.00	0.00
48.95	2.00	0.68	5.00	0.00	0.00	0.00
49.00	2.00	0.68	5.00	0.00	0.00	0.00
49.05	2.00	0.68	5.00	0.00	0.00	0.00
49.10	2.00	0.68	5.00	0.00	0.00	0.00
49.15	2.00	0.68	5.00	0.00	0.00	0.00
49.20	2.00	0.68	5.00	0.00	0.00	0.00
49.25	2.00	0.68	5.00	0.00	0.00	0.00
49.30	2.00	0.68	5.00	0.00	0.00	0.00
49.35	2.00	0.68	5.00	0.00	0.00	0.00
49.40	2.00	0.68	5.00	0.00	0.00	0.00
49.45	2.00	0.68	5.00	0.00	0.00	0.00
49.50	2.00	0.67	5.00	0.00	0.00	0.00
49.55	2.00	0.67	5.00	0.00	0.00	0.00
49.60	2.00	0.67	5.00	0.00	0.00	0.00
49.65	2.00	0.67	5.00	0.00	0.00	0.00
49.70	2.00	0.67	5.00	0.00	0.00	0.00
49.75	2.00	0.67	5.00	0.00	0.00	0.00
49.80	2.00	0.67	5.00	0.00	0.00	0.00
49.85	2.00	0.67	5.00	0.00	0.00	0.00
49.90	2.00	0.67	5.00	0.00	0.00	0.00
49.95	2.00	0.67	5.00	0.00	0.00	0.00
50.00	2.00	0.67	5.00	0.00	0.00	0.00
50.05	2.00	0.67	5.00	0.00	0.00	0.00

50.10	2.00	0.67	5.00	0.00	0.00	0.00
50.15	2.00	0.67	5.00	0.00	0.00	0.00
50.20	2.00	0.67	5.00	0.00	0.00	0.00
50.25	2.00	0.67	5.00	0.00	0.00	0.00
50.30	2.00	0.67	5.00	0.00	0.00	0.00
50.35	2.00	0.67	5.00	0.00	0.00	0.00
50.40	2.00	0.67	5.00	0.00	0.00	0.00
50.45	2.00	0.67	5.00	0.00	0.00	0.00
50.50	2.00	0.67	5.00	0.00	0.00	0.00
50.55	2.00	0.67	5.00	0.00	0.00	0.00
50.60	2.00	0.67	5.00	0.00	0.00	0.00
50.65	2.00	0.67	5.00	0.00	0.00	0.00
50.70	2.00	0.67	5.00	0.00	0.00	0.00
50.75	2.00	0.67	5.00	0.00	0.00	0.00
50.80	2.00	0.67	5.00	0.00	0.00	0.00
50.85	2.00	0.67	5.00	0.00	0.00	0.00
50.90	2.00	0.67	5.00	0.00	0.00	0.00
50.95	2.00	0.67	5.00	0.00	0.00	0.00
51.00	2.00	0.67	5.00	0.00	0.00	0.00
51.05	2.00	0.67	5.00	0.00	0.00	0.00
51.10	2.00	0.67	5.00	0.00	0.00	0.00
51.15	2.00	0.67	5.00	0.00	0.00	0.00
51.20	2.00	0.67	5.00	0.00	0.00	0.00
51.25	2.00	0.67	5.00	0.00	0.00	0.00
51.30	2.00	0.67	5.00	0.00	0.00	0.00
51.35	2.00	0.67	5.00	0.00	0.00	0.00
51.40	2.00	0.67	5.00	0.00	0.00	0.00
51.45	2.00	0.67	5.00	0.00	0.00	0.00
51.50	2.00	0.67	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

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SECTION 01-1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: 22.22.2 Eastside Fire Station Seismic Grant Upgrade

B. Owner's Name: City of Coos Bay.

C. Architect's Name: HGE Architects, Inc.

D. The Project consists of seismic upgrades to the Eastside Fire Station building.
   1. Work for this project consists of Seismic Upgrades to the existing Eastside Fire Station building. Base bid work includes all work related to the seismic upgrade: removal of existing unreinforced masonry, concrete grade beams, micropiles, concrete shear walls, reinforcing existing diaphragms and openings, square tube steel, replacing the electrical service, reroofing over the existing building with standing seam metal roofing, insulation, gypsum board, flooring, lighting, painting, openings, and other finish work related to the structural upgrades. Alternate bid work includes emergency generator.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is indicated on drawings and specified in Section 02-4100.

1.04 WORK BY OWNER.

A. See Drawings for Work by Owner items.

B. Owner will provide Hazardous Materials Report.

1.05 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

1.06 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Provide access to and from site as required by law and by Owner:
   1. Do not obstruct roadways, sidewalks, or other public ways without permit.

C. Time Restrictions:
   1. Limit conduct of especially noisy exterior work to the hours of 7:00 a.m. - 5:00 p.m.

D. Utility Outages and Shutdown:
   1. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01-2300
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

1.03 SCHEDULE OF ALTERNATES

A. Alternate No. 1 - Emergency Generator:
   1. Base Bid Item: Replace electrical service including meter and panels and provide Automatic Transfer Switch for future Emergency Generator.
   2. Alternate Item: Provide Emergency Generator. Refer to Electrical Drawings and Specification Section 26-3200 - Power Generator Systems.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01-3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Construction progress schedule.

D. Submittals for review, information, and project closeout.

E. Number of copies of submittals.

F. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 01-7000 - Execution and Closeout Requirements: Additional coordination requirements.

B. Section 01-7800 - Closeout Submittals: Project record documents.

1.03 REFERENCE STANDARDS

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Attendance Required:
   1. Owner.
   2. Architect.
   3. General Contractor, contractor's superintendent(s) and major subcontractors.

B. Agenda:
   1. Distribution of Contract Documents.
   2. Designation of personnel representing the parties to Contract, Owner, Contractor, and Architect.
   3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   4. Scheduling.

C. Record minutes and distribute copies within two days after meeting to participants, with emailed electronic copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.

B. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's superintendent.
   5. Major subcontractors.

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

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

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Submit updated schedule at each construction progress meeting.

3.04 SUBMITTALS FOR REVIEW

A. To facilitate specification compliance, submittals are required; whether as specified or as a proposed substitution. Submittals shall consist of the appropriate combination of catalog sheets, material lists, brochures, bulletins, diagrams, specifications or samples necessary to describe a system, product or item.

B. Five (5) sets of material submittals shall be submitted to Architect within three weeks following the contract signing.

C. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

D. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.

E. Samples will be reviewed for aesthetic, color, or finish selection.

F. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01-7800 - Closeout Submittals.

3.05 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01-7800 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.06 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
      b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
      c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.

B. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

C. Transmit each submittal with a copy of approved submittal form.

D. Transmit each submittal with transmittal letter.

E. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

F. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

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

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

K. Provide space for Contractor and Architect review stamps.

L. When revised for resubmission, identify all changes made since previous submission.

M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

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

END OF SECTION

SECTION 01-4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Quality assurance.

C. Control of installation.

D. Testing and inspection agencies and services.

E. Control of installation.

F. Defect Assessment.

1.02 REFERENCE STANDARDS

A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.

1.03 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.03 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

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SECTION 01-5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Project identification sign.

I. Field offices.

1.02 TEMPORARY UTILITIES

A. Owner will provide the following:
   1. Water supply, consisting of connection point for Contractor.

B. Provide and pay for all electrical power, lighting, heating and cooling, and ventilation required for construction purposes.

C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
   2. Internet Connections: Minimum of one; DSL modem or faster.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

C. At end of construction, return facilities to same or better condition as originally found.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.09 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.10 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on drawings.

B. Erect on site at location indicated.

C. No other signs are allowed without Owner permission except those required by law.

1.12 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01-6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Document 00-2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.

B. Section 01-4000 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

B. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

3.02 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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SECTION 01-7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Surveying for laying out the work.

C. Cleaning and protection.

D. Starting of systems and equipment.

E. Demonstration and instruction of Owner personnel.

F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 RELATED REQUIREMENTS

A. Section 01-1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01-3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

C. Section 01-4000 - Quality Requirements: Testing and inspection procedures.

D. Section 01-5000 - Temporary Facilities and Controls: Temporary interior partitions.

E. Section 01-7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

F. Section 01-7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

1.03 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

1.04 QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

B. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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

F. Coordinate completion and clean-up of work of separate sections.

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

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

G. Utilize recognized engineering survey practices.

H. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

J. Periodically verify layouts by same means.

K. Maintain a complete and accurate log of control and survey work as it progresses.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Patching:

1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.06 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.07 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect and Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.08 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.09 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

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

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

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

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

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SECTION 01-7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Contractor Reporting Responsibilities: Submit periodic Waste Disposal Reports; report landfill disposal, incineration, recycling, salvage, and reuse regardless of to whom the cost or savings accrues; use the same units of measure on required reports.

E. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01-1000 - Summary: List of items to be salvaged from the existing building for relocation in project or for Owner.

B. Section 01-2500 - Substitution Procedures.

C. Section 01-3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

D. Section 01-5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

E. Section 01-6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

F. Section 01-7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01-3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01-5000 for additional requirements related to trash/waste collection and removal facilities and services.

C. See Section 01-6000 for waste prevention requirements related to delivery, storage, and handling.

D. See Section 01-7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Prebid meeting.
   2. Preconstruction meeting.
   3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

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SECTION 01-7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

D. Evidence of Payments and Release of Liens.

1.02 RELATED REQUIREMENTS

A. Section 00-7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01-3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Section 01-7000 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

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

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

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

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

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

L. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.05 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
   1. General Warranties:

a. Provide one-year warranty as described in the General Conditions, Article 3.5. Warranty period shall commence on the date of the fully executed Certificate of Substantial Completion.
b. Weather-tight warranty: The Contractor shall, and hereby does, warranty flashings, roofing, and all other work which is a component part of the roofing to be weather-tight under ordinary wear and usage for a period of two years from and after Substaintial Completion of the building. This is an extension of the general one year warranty described above. Further, the Contractor shall warranty that it will make good without delay all defects of labor and materials without additional cost to the Owner.

2. Additional Warranties: See individual technical specification sections for written warranties for specific projects of work.
3. Warranty period shall begin upon Substantial Completion, or if a Certificate of Substantial Completion is not issued or if Work which is to be covered by warranty is not then complete, Warranty Period shall begin upon the date of Final Acceptance or on the date appearing on the final Certificate for Payment to the Contractor, whichever is earlier.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.06 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

A. Submit with Final Application for Payment the following:
1. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
2. Contractor's Affidavit of Release of Liens: AIA G706A, with
a. Consent of Surety to Final Payment (AIA G707) with accompanying Power of Attorney.
b. Contractor's release or waivers of liens.
c. Separate releases or waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner.

END OF SECTION

SECTION 02-4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

B. Removal of hazardous materials and toxic substances. Refer to Hazardous Materials Report.

C. Modification of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 01-1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01-2300 - Alternates.

C. Section 01-5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01-7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. See Drawings for scope of demolition work.

B. See Hazardous Materials Report for scope of asbestos abatement and removal of other hazardous materials.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Use of explosives is not permitted.

3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
4. Provide, erect, and maintain temporary barriers and security devices.
5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
7. Do not close or obstruct roadways or sidewalks without permit.
8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

D. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

E. Noise Control: Maintain a reasonable degree of quiet throughout progress of the work so as not to disturb Owner's work in adjoining rooms. Machines and tools must operate below OSHA noise and fume standards.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

G. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

H. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

E. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

F. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

G. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. See Section 01-1000 for other limitations on outages and required notifications.
   3. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 03-3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Miscellaneous concrete elements, including equipment pads and equipment pads.

C. Concrete curing.

D. Vapor barriers.

1.02 RELATED REQUIREMENTS

A. Section 01-4000 - Quality Requirements.

B. Structural Drawings.

1.03 REFERENCE STANDARDS

A. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).

B. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

C. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

D. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

E. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

F. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

G. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.

H. ACI PRC-308 - Guide to External Curing of Concrete; 2016.

I. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

J. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).

L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2017b.

M. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.

N. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.

O. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

P. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.

Q. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

T. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2017a.

U. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.

V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

W. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.

X. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

Y. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.

Z. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2015.

AA. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.

BB. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

CC. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004, with Editorial Revision (2013).

DD. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 2014.

EE. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric); 2014.

FF. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix design.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Test Reports: Submit report for each test or series of tests specified.

F. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

B. Follow recommendations of ACI PRC-305 when concreting during hot weather.

C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

D. Installer Qualifications: Concrete work shall be finished by persons with at least 5 years experience with work of similar scope and quality.

E. On-Site water addition to concrete will not be permitted.

F. Conduct field-testing as specified.

G. Admixtures shall be added in strict conformance with the manufacturer’s instructions.

H. Manufacturer Qualifications: Concrete supplied from concrete plants with current certification under the NRMCA Certification of Ready Mixed Concrete Production Facilities. Individual with responsibility for concrete mixtures certified as an NRMCA Concrete Technologist Level 2.

PART 2 PRODUCTS

2.01 FORMWORK

A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
   2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface. Fill all voids after cones have been removed.

2.02 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.

C. Lightweight Aggregate: ASTM C330/C330M.

D. Fly Ash: ASTM C618, Class C or F.

E. Calcined Pozzolan: ASTM C618, Class N.

F. Silica Fume: ASTM C1240, proportioned in accordance with ACI PRC-211.1.

G. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.03 CONCRETE MIX DESIGN

A. Compy with requirements of this Section and the following:
   1. Minimum Cement Content: Six sacks per cubic yard of concrete.
   2. Slump of concrete shall be consistent throughout Project at 4 inches or less. At no time shall slump exceed 5 inches. If super plasticizers or mid-range water reducers are allowed, slump shall not exceed 8 inches.

B. Do not add calcium to mix as it causes mottling and surface discoloration.

C. Supplemental admixtures shall not be used unless approved by manufacturer.

D. Do not add water to the mix in the field.

E. Maximum air content shall not exceed 5 percent.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:
   1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
   2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   3. Products:
      a. Stego Industries, LLC; Stego Wrap 15-Mil Vapor Barrier: www.stegoindustries.com/#sle.
      b. Substitutions: See Section 01-6000 - Product Requirements.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.
   2. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.

3. Flowable Products:
    a. SpecChem, LLC; SC Precision Grout: www.specchemllc.com/#sle.
    b. ProSpec, an Oldcastle brand; C-1107 Construction Grout: www.prospec.com/#sle.
    c. The QUIKRETE Companies; QUIKRETE® Exterior Use Anchoring Cement: www.quikrete.com/#sle.
    d. Substitutions: See Section 01-6000 - Product Requirements.
4. Low-Slump, Dry Pack Products:
    a. SpecChem, LLC; SC Multipurpose Grout: www.specchemllc.com/#sle.
    b. The QUIKRETE Companies; QUIKRETE® FastSet™ Non-Shrink Grout: www.quikrete.com/#sle.
    c. Substitutions: See Section 01-6000 - Product Requirements.

2.06 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
1. Products:
    a. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com/#sle.
    b. W. R. Meadows, Inc ; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.
    c. Substitutions: See Section 01-6000 - Product Requirements.

B. Water: Potable, not detrimental to concrete.

2.07 CONCRETE MIX DESIGN

A. Compy with requirements of this Section and the following:
1. Minimum Cement Content: Six sacks per cubic yard of concrete.
2. Slump of concrete shall be consistent throughout Project at 4 inches or less. At no time shall slump exceed 5 inches. If super plasticizers or mid-range water reducers are allowed, slump shall not exceed 8 inches.

B. Do not add calcium to mix as it causes mottling and surface discoloration.

C. Supplemental admixtures shall not be used unless approved by manufacturer.

D. Do not add water to the mix in the field.

E. Maximum air content shall not exceed 5 percent.

F. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

G. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.
1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

H. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

I. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,000 psi, unless drawings indicate otherwise. Concrete should be a minimum of a 6-sack mix.
2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
5. Water-Cement Ratio: Maximum 40 percent by weight.
6. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
7. Maximum Slump: 4 inches.
8. Maximum Aggregate Size: 3/4 inch.

2.08 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

B. Verify Subgrade is prepared and compacted and aggregate base is placed and compacted according to specifications.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI SPEC-301. Design and fabricate forms to support all applied loads until concrete is cured and for easy removal without damage to concrete.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Place concrete for floor slabs in accordance with ACI PRC-302.1.

C. When installing a continuous pour section, ensure that trucks arrive and concrete is placed with no greater than 45 minutes elapsing between lifts.

D. Notify Architect and Owner's Independant Testing Agency not less than 24 hours prior to commencement of placement operations.

E. Ensure reinforcement, inserts, and embedded parts will not be disturbed during concrete placement.

F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 feet.
   2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
   3. Under Carpeting: 1/4 inch in 10 feet.

B. Correct the slab surface if tolerances are less than specified.

3.06 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/8 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
   1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI PRC-302.1; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
   2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI PRC-302.1; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   3. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.

3.07 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308. 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.
   1. Normal concrete: Not less than seven days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
      a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
      b. Spraying: Spray water over floor slab areas and maintain wet.
      c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
   3. Final Curing: Begin after initial curing but before surface is dry.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01-4000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

3.09 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.10 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

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SECTION 05-5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Bollards.

C. Refer to Structural Drawings for miscellaneous structural steel items.

1.02 RELATED REQUIREMENTS

A. Section 09-9000 Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

E. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

I. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Pipe: ASTM A53/A53M, Grade B Schedule 40, hot-dip galvanized finish.

C. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

D. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; safety yellow paint finish.

2.04 FINISHES - STEEL

A. Prepare surfaces to be primed in accordance with SSPC-SP2.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Prime Painting: One coat.

D. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements. All exterior fabricated steel, handrails to be hot-dipped galvanized.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 PREPARATION

A. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Obtain approval prior to site cutting or making adjustments not scheduled.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

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SECTION 05-5150
LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum access ladders.

1.02 REFERENCES

A. AA – Aluminum Association.

B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

D. OSHA 1910.27 – Fixed Ladders.

1.03 SUBMITTALS

A. Submit under provisions of Section 01-3000.

B. Product Data: Manufacturer's data sheets on each product.

C. Shop Drawings:
   1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
   2. Provide templates for anchors and bolts specified for installation under other Sections.
   3. Provide reaction loads for each hanger and bracket.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
   1. Record of successful in-service performance.
   2. Sufficient production capacity to produce required units.
   3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.

B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.

C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.05 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurement before fabrication.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: O'Keeffe's, Inc.; 325 Newhall St. San Francisco, CA 94124. ASD. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: http://www.okeeffes.com.

B. Substitutions: See Section 01-6000 - Product Requirements.

2.02 APPLICATIONS/SCOPE

A. Fixed Access Ladder:
   1. Standard Duty Channel Rail.
      a. Model 500 as manufactured by O'Keeffe's Inc.
      b. Provide telescoping safety post.
      c. Location: Apparatus Bay to attic.
      d. Qty: one (1).

2.03 FINISHES

A. Mill finish. As extruded.

2.04 MATERIALS

A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.

B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.05 FABRICATION

A. Rungs shall withstand a 500 pound load without deformation or failure.

B. Channel Side Rails: Not less than 1/8 inch wall thickness by 3 inches wide.

C. Landing Platform: 1-1/2 inches or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.

D. Ladder Safety Post: Retractable hand hold and tie off.
   1. Location: At standard fixed ladder only, to provide hand hold up thru roof hatch.

PART 3 EXECUTION

3.01 EXAMINATION

A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.

B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.

C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.03 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION

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SECTION 06-1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonstructural dimension lumber framing.

B. Sheathing.

C. Preservative treated wood materials.

D. Miscellaneous framing and sheathing.

E. Concealed wood blocking, nailers, and supports.

F. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.

B. Section 07-6200 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2015.

E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.

F. PS 1 - Structural Plywood; 2009.

G. PS 20 - American Softwood Lumber Standard; 2015.

H. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2004, and supplements.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

D. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

E. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.05 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

B. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.

C. Sill Flashing: See Section 07-6200.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Products:
      a. Lonza Group: www.wolmanizedwood.com/#sle.
      b. Koppers Performance Chemicals, Inc: www.koppersperformancechemicals.com/#sle.
      c. Viance, LLC: www.treatedwood.com.
      d. Osmose, Inc: www.osmose.com.
      e. Substitutions: See Section 01-6000 - Product Requirements.
   2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.40 lb/cu ft retention.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber exposed to weather.
      c. Treat lumber in contact with roofing, flashing, or waterproofing.
      d. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 PREPARATION

A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

D. Provide the following specific nonstructural framing and blocking:
1. Cabinets and shelf supports.
2. Wall brackets.
3. Handrails.
4. Grab bars.
5. Towel and bath accessories.
6. Wall-mounted door stops.
7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.06 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.07 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 CLEANING

A. Waste Disposal: See Section 01-7419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

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SECTION 06-2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood door frames, glazed frames.

B. Wood casings and moldings.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 08-1416 - Flush Wood Doors.

C. Section 09-9000 - Painting and Coating: Painting and finishing of finish carpentry items.

D. Section 09-9113 - Exterior Painting: Painting of finish carpentry items.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

B. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.

B. Unless otherwise indicated provide products of quality specified by Woodwork Institute Manual of Millwork for Premium grade.

C. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

D. Exterior Woodwork Items:

1. Soffits and Fascias: Prepare for paint finish.

E. Interior Woodwork Items:
1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.

2.02 LUMBER MATERIALS

A. Softwood Lumber: Doug-Fir KD S4s, clear vertical grade species, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
1. Grading: In accordance with rules certified by ALSC; www.alsc.org.
2. Location: Interior.

B. Softwood Lumber: Resawn texture cedar, K.D., grade C and better species, maximum moisture content of 6 percent; primed, fingerjointed, 20 foot lengths.
1. Location: Exterior.

2.03 ADHESIVE

A. Adhesive: Type recommended by AWI to suit application .

2.04 ACCESSORIES

A. Lumber for Shimming and Blocking: Softwood lumber of indicated species.

B. Wood Filler: Solvent base, tinted to match surface finish color.

2.05 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.01 INSTALLATION

A. Set and secure materials and components in place, plumb and level.

B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.02 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09-9000.

END OF SECTION

SECTION 06-4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Hardware.

D. Factory finishing.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 09-9900 - Painting and Coating

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).

C. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.

D. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.

E. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.

F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

G. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

H. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).

I. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.

J. PS 1 - Structural Plywood; 2009.

K. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

C. Product Data: Provide data for hardware accessories.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.02 LUMBER MATERIALS

A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as indicated on drawings.

B. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as indicated on drawings.

2.03 PANEL MATERIALS

A. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.

C. Plywood for Non-Decorative Purposes: NIST PS 1, Interior rated adhesives, core of seven (7) wood plies from listed species unless otherwise indicated, thickness as indicated or as required by application.
   1. Semi-Exposed Surfaces: APA A-B Grade, rotary cut redwood face veneer.
   2. Concealed Surfaces: PS 1; APA B-B Grade, rotary cut Douglas fir face veneer.
   3. Location: At countertops and base cabinets in all sink and lavatory locations.

D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.

E. Pre-Finished High Density Particle Board (PFHDPB)

2.04 LAMINATE MATERIALS

A. Provide specific types as indicated.
   1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, color, finish as indicated.
   2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, color, finish as indicated.

2.05 COUNTERTOPS

A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated, with decorative PVC edge.
   1. Counter Plastic Edge Banding/Profile: Radius edge with thick applied band, 0.12 inch thick, 1/8 inch nominal (3 mm) radius edge with thick applied band, shaped; smooth finish; of width to match component thickness, color as selected from manufacturer's standards.

B. Solid Surfacing-Material Countertops:
   1. Corian or equal.
   2. Location: As indicated in Drawings.

2.06 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Typical Plastic Edge Banding/Profile: Radius edge with thick applied band, 0.12 inch thick, 1/8 inch nominal (3 mm) radius edge with thick applied band shaped; smooth finish; of width to match component thickness, color as selected from manufacturer's standards.
   1. Use at all drawer and door edges.

C. Other Edge Banding/Profile: Impact resistant HPDL or PVC edge banding, square edge with thin applied band, 1/16 inch thick, square edge with thin applied band, flat shaped; smooth finish; of width to match component thickness
   1. Use at all exposed shelf edges, casework boxes. Ease edge of banding to remove any sharp edges.

D. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

E. Concealed Station Brackets:
   1. Product: "C" (Concealed Bracket), "EC" (Extended Concealed Bracket); steel, black powder coat, mounting hardware as recommended by manufacturer; manufactured by A & M Hardware, Inc.; www.AandMhardware.com; 1-888-647-0200.
      a. "C", without upper extension:
         1) 9" Support Arm, 4,520 lbs/pair load limit
         2) 12" Support Arm, 4,020 lbs/pair load limit
         3) 18" Support Arm, 2,060 lbs/pair load limit
         4) 24" Support Arm, 1,800 lbs/pair load limit
      b. "EC", with upper extension:
         1) 9" Support Arm, 7,960 lbs/pair load limit
         2) 12" Support Arm, 3,100 lbs/pair load limit
         3) 18" Support Arm, 4,500 lbs/pair load limit
         4) 24" Support Arm, 2,320 lbs/pair load limit
      c. Color: Black powder coat.
   2. Substitutions: See Section 01-6000 - Product Requirements.

F. Surface Station Brackets:
   1. Product:Standard Bracket; steel, black powder coat, mounting hardware as recommended by manufacturer; manufactured by A & M Hardware, Inc.; www.AandMhardware.com; 1-888-647-0200.
      a. Color: Black powder coat.
      b. Size: A & M "24 x 24".
   2. Substitutions: See Section 01-6000 - Product Requirements.

2.07 HARDWARE

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.

C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.

D. Catches: Touch type.

E. Drawer Slides:
   1. Type: Full extension.
   2. Static Load Capacity: Commercial grade.
   3. Manufacturers:
      a. Knape & Vogt Manufacturing Company; Light-Duty Drawer Slides: www.knapeandvogt.com/#sle.

F. Hinges: European style concealed self-closing type, steel with polished finish.
   1. Manufacturers:
      a. Blum, Inc: www.blum.com/#sle.

2.08 SITE FINISHING MATERIALS

A. Finishing: Field finished as specified in Section 09-9000.

2.09 FABRICATION

A. Cabinet Style: Flush overlay.

B. Cabinet Doors and Drawer Fronts: Flush style.

C. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

D. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

E. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
   1. Cap exposed plastic laminate finish edges with material of same finish and pattern.

F. Solid Surfacing-Material: Fabricate tops on one piece, unless otherwise indicated. Comply with solid surfacing-material manufacture's written recommendations for adhesives, sealer, fabrication and finishing.

G. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

2.10 FACTORY FINISHING

A. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, Nitrocellulose Lacquer, Transparent.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

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SECTION 07-2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation and vapor retarder in exterior wall construction at wall strengthening areas of work only.

1.02 REFERENCE STANDARDS

A. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2016a.

1.03 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.04 LABELING REQUIREMENTS

A. Building Thermal Envelope Insulation:
   1. An R-value identification mark is applied (by manufactrer) to each piece of insulation 12 inches or greater in width.
   2. Alternately, the insulation installers have provided a signed, dated and posted certification listing the type, manufactrer and R-value of installation installed.

B. Insulation Mark Installation:
   1. Insulation materials are installed such that the manufactrer's R-value is readily observable upon inspection.

C. Insulation Product Rating:
   1. The thermal resistance (R-value) of insulation has been determined in accordance with the US FTC R-value rule.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermal Insulation:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Johns Manville Corporation: www.jm.com.

3. Knauf Insulation GmbH: www.knaufinsulation.us.
4. Owens Corning Corp: www.owenscorning.com.
5. Substitutions: See Section 016000 - Product Requirements.

2.02 APPLICATIONS

A. Insulation in Wood Framed Walls: Batt insulation with integral vapor retarder.

B. Insulation in Wood Framed Roof Structure: Batt insulation with integral vapor retarder.

2.03 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Where batt insulation is indicated, use glass fiber batt insulation.

B. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.

C. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
1. Material: Glass fiber.
2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Thermal Resistance: R of [21 and 38].
6. Thickness: 5-1/2 and 12 inches.
   a. Walls: R-21
   b. Roof (attic area): R-38.
7. Vapor Barrier Facing: Aluminum foil, flame spread 25 rated; one side (or equivalent), when not in direct contact with finish material, paper face elsewhere.
8. Products:
   a. CertainTeed Corporation: www.certainteed.com.
   b. Johns Manville: www.jm.com.
   c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.
   d. Knauf Insulation GmbH: www.knaufinsulation.us.
   e. Owens Corning Corp: www.owenscorning.com.
9. Substitutions: See Section 01-6000 - Product Requirements.

2.04 ACCESSORIES

A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
1. Application: Sealing of interior circular penetrations, such as pipes or cables.
2. Width: Are required for application.

B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide, at foil face vapor barrier areas, polyester elsewhere.

C. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

D. Wire: Galvanized steel.

E. Support tape: Nylon reinforced or as approved by manufacture.

F. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.02 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over face of member.

F. Tape seal tears or cuts in vapor retarder.

G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

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SECTION 07-2500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water-resistive barriers.

B. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.

C. Vapor Retarder/Cavity Wall barrier.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Water-resistive barrier under exterior cladding.

B. Section 07-2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.

C. Section 07-6100 - Sheet Metal Roofing.

D. Section 07-6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

E. Section 07-9005 - Joint Sealers: Sealant materials and installation techniques.

1.03 DEFINITIONS

A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
   1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/(Pa s sq m) = 1 perm.

D. Water-Resistive Barrier: A material behind an exterior wall covering that is intended to resist liquid water that has penetrated behind the exterior covering from further intruding into the exterior wall assembly.

1.04 REFERENCE STANDARDS

A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2014.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

E. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2013.

1.05 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.

2.02 WATER-RESISTIVE BARRIER MATERIALS

A. Plastic Sheet: Polymeric-based sheet complying with requirements of ICC-ES AC38, Grade D, with 60-minute water resistance; polyethylene sheet is not permitted.
   1. Water Resistance: Withstand hydrostatic head of 21 inches, minimum, for at least five hours; pass test method in accordance with AATCC Test Method 127.

2.03 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Self-Adhered Water Resistant Air Barrier Membrane:
   1. Air Permeance: 0.004 cubic feet per square foot, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
   3. Water Vapor Permeance: 29 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
   4. Dry Film Thickness: 28 mils (0.028 inch), minimum.
   5. Criteria for Water Resistance Barriers: Pass, when tested in accordance with ICC - ES AC38.
   6. Water Penetration around Nails: Pass, when tested in accordance with AAMA 711-05 and modified ASTM D 1970.
   7. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
   8. Manufacturers:
      a. Henry Company Blueskin VP 160..
      b. Substitutions: See Section 01-6000 - Product Requirements.
   9. Location: Exterior walls as shown in Drawings.

2.04 ADHESIVES

A. Approved adhesive-primer: Blueskin Adhesive, roller applied, per manufacture recommendations. Provide at all areas to recieve weather barrier - entire exterior wall areas.

2.05 ACCESSORIES

A. Sealants, Tapes, and Accessories Used for Sealing Water-Resistive Barrier and Adjacent Substrates: As indicated or complying with water-resistive barrier manufacturer's installation instructions.

B. Thinners and Cleaners: As recommended by water-resistive barrier manufacturer.

2.06 SELF-ADHERING FLASHING

A. Manufacturer and Product:
   1. W.R. Grace Construction Products "Perm-A-Barrier".
   2. Henry Company, Blueskin SA.
   3. Substitutions: See Section 01-6000 - Product Requirements.

B. Materials: Rubberized asphalt and polyethylene. 40 mils thickness.

C. Location: Where noted on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Water-Resistive Barriers: Install continuous water-resistive barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Mechanically Fastened Exterior Sheets:
   1. Install sheets shingle-fashion to shed water, with seams aligned horizontal.
   2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
   3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.

4. Attach to framed construction with fasteners extending through sheathing into framing, and space fasteners at 12 to 18 inches on center along each framing member supporting sheathing.
5. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
6. Install water-resistive barrier over jamb flashings.
7. Install head flashings under water-resistive barrier.
8. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.

E. Self-Adhered Sheets:
1. All surfaces to receive membrane must be dry and clean of oil, dust, fronts, bulk water and other contaminiates that would be detrimental to adhesion of membrane. Approved adhesive -primer to be applied as recommended by Membrane manufacturer.
2. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
3. Lap sheets shingle-fashion to shed water and seal laps airtight.
4. Upon placement of sheets, firmly press onto substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
5. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
6. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.

F. Openings and Penetrations in Exterior Water-Resistive Barriers:
1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.
7. Refer to Drawings for additional placement requirements, and coordination placement with metal flashings.

3.04 FIELD QUALITY CONTROL

A. See Section 01-4000 - Quality Requirements for additional requirements.

B. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency.
1. Allow access to work areas and staging.
2. Notify Owner’s testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
3. Do not cover work of this section until testing and inspection is accepted.

C. Do not cover installed weather barriers or vapor retarders until inspections have been completed.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

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SECTION 07-4646
FIBER-CEMENT SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiber-cement siding.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Water-resistive barrier under siding.

B. Section 07-2500 - Weather Barriers: Water-resistive barrier under siding.

C. Section 07-9200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

D. Section 09-9000 Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015, with Editorial Revision (2016).

B. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2016).

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.

C. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).

D. Installer's qualification statement.

E. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.

F. Warranty: Submit copy of manufacturer’s warranty, made out in Owner’s name, showing that it has been registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of type specified in this section with not less than three years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01-7419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.

C. Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

D. Protect materials from harmful environmental elements, construction dust, and other potentially detrimental conditions.

1.07 FIELD CONDITIONS

A. Do not install panels when air temperature or relative humidity are outside manufacturer's limits.

1.08 WARRANTY

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

B. Manufacturer Warranty: Provide manufacturer warranty for years as indicated under Fiber-Cement Siding article sub-headings for "Warranty". Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

A. Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
   1. Texture: Smooth.
   2. Length (Height): 96 inches, nominal.
   3. Width: 48 inches.
   4. Thickness: 5/16 inch, nominal.
   5. Finish: Factory applied primer.
   6. Color: As indicated on drawings.
   7. Warranty: 50 year limited; transferable.
   8. Products:
      a. James Hardie Building Products, Inc: www.jameshardie.com/#sle.
      b. Substitutions: See Section 01-6000 - Product Requirements.

B. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
   1. Texture: Smooth.
   2. Length: 96 inches, nominal.
   3. Width: 48 inches.
   4. Thickness: 5/16 inch, nominal.
   5. Finish: Factory applied primer.
   6. Color: As indicated on drawings.
   7. Manufacturer: Same as siding.

2.02 ACCESSORIES

A. Metal Trim: Extruded aluminum alloy 6063-T5 temper.
   1. Finish: Field painted.

B. Fasteners: Galvanized or corrosion resistant; length as required to penetrate, 1-1/4 inches, minimum.

C. Exterior Soffit Vents: One piece, perforated, ASTM A653/A653M galvanized steel with G90 coating, with flat panel edge and manufactured especially for soffit application, and provide continuous vent.

D. Sealant: Elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

E. Finish Paint: Latex house paint acceptable to siding manufacturer; primer recommended by paint manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Do not begin until unacceptable conditions have been corrected.

C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Protect surrounding areas and adjacent surfaces during execution of this work.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with terms necessary to maintain warranty coverage.
   2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
   3. Use trim details as indicated on drawings.
   4. Touch up field cut edges before installing.
   5. Pre-drill nail holes if necessary to prevent breakage.

B. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.

C. Exterior Soffit Vents: Install in accordance with manufacturer's written instructions and at locations indicated on drawings; provide vent area as indicated on drawings.

D. Finish Painting: See Section 09-9000.

3.04 CLEANING

A. See Section 01-7000 - Execution and Closeout Requirements for additional requirements.

B. Clean faced panels in accordance with manufacturer's maintenance instructions, using cleaning materials and methods acceptable to manufacturer.

3.05 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07-6100
SHEET METAL ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. 2 inch high, mechanically-seamed sheet metal roofing, associated flashings, slip sheet, and self adhered weather barrier for a complete manufacturers approved system.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 07-6200 - Sheet Metal Flashing and Trim: Placement of flashing, gutters, downspouts, copings, reglets and accessories.

1.03 REFERENCE STANDARDS

A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

C. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2020.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

E. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.

F. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2017.

G. ICC-ES AC188 - Acceptance Criteria for Roof Underlayments; 2012, with Editorial Revision (2015).

H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Product Data: Provide data on metal types, finishes, and characteristics.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise noted.

B. Installer Qualifications: Company specializing in performing sheet metal roof installations with minimum 5 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

1.07 WARRANTY

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

B. Provide 35 year manufacturer warranty for coating performance. Warranty shall include degradation of metal finish.

C. Metal substrate will not rupture, fail structurally, or perforate.

D. Installer's and General Contractor's Warranty: Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, covering repairs required to maintain roof panels watertight and weatherproof with normal usage for two years following Project Substantial Completion date.

E. Weathertight Performance Warranty: Manufacturer's standard warranty in which manufacturer agrees to repair or replace metal roof panel assemblies that fail to remain weathertight within 20 years.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M); 22 gage, 0.04 inch minimum base metal thickness; plain texture; shop pre-coated with polyvinylidene fluoride (PVDF) coating, color as selected by Architect.

2.02 MANUFACTURER

A. Custom-Bilt Metals. 800-826-7813, info@custombiltmetals.com
   1. Panel Designation: "Titan CB-2000".

B. AEP Span. 877-742-9131, customercare@aepspan.com
   1. Panel Designation: "Span-Lok hp".

C. Taylor Metal Products. 800-574-1388, www.Taylormetal.com
   1. Panel Designation: "MS-200", typical.

D. Substitutions: See Section 01-6000 - Product Requirements.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, same gage as roofing sheet.

C. Fabricate starter strips, interlockable with sheet.

D. Form pieces in longest practical lengths.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

G. Seam height: 2 inches.

2.04 SEAMS:

A. Panel seams shall interlock entire length of seam.

B. Design standing seam to lock up and resist joint disengagement during design wind uplift conditions as calculated according to local building codes.

C. Provide pre-installed sealant within confines of panel's female leg to aid in resistance of leaks and provide panel-to-panel seal while allowing expansion and contraction movement.

D. Seams shall be continuously locked or crimped together by mechanical means during installation. Seaming tools shall be sourced from manufacturer's recommended vendor.

2.05 FINISHES

A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

B. Primer Coat: On coated sheets, finish concealed side of sheet with primer compatible with finish system as recommended by finish system manufacturer.

2.06 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Slip Sheet Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
   1. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-self-adhesive sheet.
   2. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
   3. Flammability: Minimum of Class A, when tested in accordance with ASTM E108.
   4. Ultraviolet Resistance and Weatherability: Approved in writing by manufacturer for exposure to weather for minimum of 12 months.
   5. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
   6. Fasteners: As specified by manufacturer and building code qualification report or approval, if any.
   7. Products - as approved by metal roofing manufacturer only:
      a. Certainteed "Diamond Deck".
      b. GAF "Tigerpaw".

C. SA Underlayment: Self-adhering butyl-rubber sheet complying with ASTM D1970/D1970M; strippable release film.
   1. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
   2. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
   3. Approved Manufacturers and Products:
      a. W.R. Grace Construction Products "Ice and Water Shield".

b. GAF-Elk "StormGuard".
c. Owens Corning "Weatherlock Flex".
d. Certainteed "Winter Guard".
e. Substitutions: See Section 01-6000 - Product Requirements.

D. Concealed Sealants: Non-curing butyl sealant.

E. Exposed Sealants: ASTM C920 elastomeric sealant, with minimum movement capability as recommended by manufacturer for sealed substrates; color to match adjacent material.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.

B. Verify deck is dry and free of snow or ice. Verify joints in wood deck are solidly supported and fastened.

C. Verify correct placement of wood nailers and insulation positioning between nailers.

D. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.

E. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

C. Place eave edge and gable edge metal flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 6 inches OC.

3.03 INSTALLATION - ROOFING

A. Apply SA underlayment over entire roof area, prior to insulation, directly on roof deck.
1. Apply in single layer laid perpendicular to slope; weather lap edges 6 inches.

B. Install slip sheet underlayment.
1. Apply in single layer laid perpendicular to slope; weather lap edges 6 inches.

C. Cleat and seam all joints.

D. Install in complete accordance with roof panel manufacturer's instructions for assembly and installation.

E. Cutting and Fitting:
1. Cut panels neat, square, and true with shearing action cutters. Torch or power saw cutting is prohibited.
2. Openings 6 inches and larger: Shop fabricate and reinforce to maintain original load capacity.
3. Openings less than 6 inches: Field cutting is acceptable.

F. Install panels in accordance with manufacturer's instructions and recommendations. Anchor securely in place using clips and fasteners spaced in accordance with manufacturer's recommendations for design wind load criteria.

G. Form seams with manufacturer-approved motorized seaming tool; completely engage panel, clip, and factory-applied sealant in seam.

H. Comply with methods and recommendations of SMACNA Architectural Sheet Metal Manual for flashing configurations required.

3.04 INSTALLATION - STANDING SEAM ROOFING

A. Lay sheets with long dimension perpendicular to eaves. Apply pans beginning at eaves.

B. Lock cleats into seams and flatten.

C. At eaves and gable ends, terminate roofing by hooking over edge strip.

D. Fold lower ends of seams at eaves over at 45 degree angle.

3.05 FIELD QUALITY CONTROL

A. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.06 PROTECTION

A. Do not permit traffic over unprotected roof surface.

END OF SECTION

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SECTION 07-6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Wood nailers for sheet metal work.

B. Section 07-6100 - Sheet Metal Roofing.

C. Section 07-9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015, with Editorial Revision (2016).

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

F. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.

G. CDA A4050 - Copper in Architecture - Handbook; current edition.

H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch (24 gauge) thick base metal, shop pre-coated with modified silicone coating.
   1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
   2. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.

B. Stainless Steel: ASTM A666, Type 304, soft temper, 28 gage (0.0156 inch) thick; smooth No. 4 finish.

2.02 ACCESSORIES

A. Fasteners: Galvanized steel , with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Protective Backing Paint: Zinc molybdate alkyd.

D. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.

E. Sealant to be Exposed in Completed Work: Elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

F. Sealant: Type 1 specified in Section 07-9005.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches over roofing edge. Return and brake edges.

2.04 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters: SMACNA (ASMM) Rectangular profile.

B. Downspouts: Rectangular profile.

C. Gutters and Downspouts: Size indicated.

D. Accessories: Profiled to suit gutters and downspouts.
   1. Anchorage Devices: In accordance with SMACNA requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.

E. Seal metal joints.

2.05 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Concealed Sealants: Non-curing butyl sealant.

C. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

D. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Conform to drawing details.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Secure gutters and downspouts in place using concealed fasteners.

G. Slope gutters 1/8 inch per foot minimum.

H. Connect downspouts to downspout boots. Seal connection watertight.

I. Set splash pads under downspouts.

3.04 FIELD QUALITY CONTROL

A. See Section 01-4000 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07-9005
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

A. Section 07-2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:

B. Section 08-8000 - Glazing: Glazing sealants and accessories.

C. Section 09-2116 - Gypsum Board Assemblies: Acoustic sealant.

1.03 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2017.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

D. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

E. ASTM C 1521 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Joint Sealants.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.01 SEALANTS

A. Type 1 - General Purpose Exterior Sealant: Elastomeric Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
   1. Color: color as selected.

2. Product: Sonolastic NP-1 manufactured by BASF.
3. Applications: Use for:
    a. Control, expansion, and soft joints in masonry.
    b. Joints between concrete and other materials.
    c. Joints between metal frames and other materials.
    d. Joints at wood siding and trim as indicated.
    e. Other exterior joints for which no other sealant is indicated.
4. Test Data:
    a. Movement capability, % - +100 to -50.
    b. Tensile strength - 250 psi.
    c. Ultimate elongation at break, % - 1000.
    d. Hardness, Shore A - passes 25 - 30.

B. Type 2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
1. Color: Match adjacent finished surfaces.
2. Product: Sonalac manufactured by BASF.
3. Applications: Use for:
    a. Interior wall and ceiling control joints.
    b. Joints between door and window frames and wall surfaces.
    c. Other interior joints for which no other type of sealant is indicated.

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056 sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
   1. Width/depth ratio of 2:1.
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

3.06 SCHEDULE

A. Exterior Joints for Which No Other Sealant Type is Indicated: Type 1.

B. Interior Joints for Which No Other Sealant is Indicated: Type 2.

END OF SECTION

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SECTION 08-1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Thermally insulated hollow metal doors with frames.

D. Hollow metal borrowed lites glazing frames.

E. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

A. Section 08-7100 - Door Hardware.

B. Section 08-8000 - Glazing: Glass for doors and borrowed lites.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015, with Editorial Revision (2016).

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:
1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
2. Republic Doors: www.republicdoor.com.
3. Steelcraft, an Allegion brand: www.allegion.com/sle.
4. Technical Glass Products; SteelBuilt Window & Door Systems: www.tgpamerica.com/#sle.
5. Steelcraft: www.steelcraft.com.
6. Substitutions: See Section 01-6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Door Finish: Factory primed and field finished.

B. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

a. Level 1 - Standard-duty.
b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
c. Model 1 - Full Flush.
d. Door Face Metal Thickness: 20 gauge, 0.032 inch 20 gauge, 0.032 inch, minimum.
e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.

2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inches, nominal.
4. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. General:
1. Comply with the requirements of grade specified for corresponding door, except:
a. ANSI A250.8 Level 1 Doors: 16 gage frames.
b. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
2. Finish: Factory primed, for field finishing.

D. Exterior Door Frames: Full profile/continuously welded type.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
3. Weatherstripping: Separate, see Section 08-7100.

E. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
3. Frame Finish: Factory primed and field finished.

F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
1. Style: Standard straight slat blade.

B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
   1. Size: 12 inch wide by 12 inch high.
   2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
   3. Metal Finish: Beige polyester powder coating.
   4. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
   5. Manufacturers:
      a. All Metal Stamping: www.allmetalstamping.com/#sle.
      b. Substitutions: See Section 01-6000 - Product Requirements.

C. Glazing: As specified in Section 08-8000, factory installed.

D. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.07 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 08-7100.

D. Comply with glazing installation requirements of Section 08-8000.

E. Coordinate installation of electrical connections to electrical hardware items.

F. Touch up damaged factory finishes.

3.03 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

A. Refer to Door Schedule on the drawings.

END OF SECTION

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SECTION 08-1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; non-rated.

1.02 RELATED REQUIREMENTS

A. Section 08-1113 - Hollow Metal Doors and Frames.

B. Section 08-7100 - Door Hardware.

C. Section 08-8000 - Glazing.

D. Section 09-9000 Painting and Coating: Field finishing of doors.

1.03 REFERENCE STANDARDS

A. ICC (IBC) - International Building Code; 2012.

B. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

C. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Samples: Submit two samples of door veneer, 12 by 12 inch in size illustrating wood grain, stain color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Warranty, executed in Owner's name.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.06 WARRANTY

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Graham Wood Doors: www.grahamdoors.com.
   2. Haley Brothers: www.haleybros.com/#sle.
   3. Marshfield Door Systems, Inc: www.marshfielddoors.com.
   4. VT Industries, Inc: www.vtindustries.com.
   5. Oregon Door: www.oregondoor.com.
   6. Lynden Door: www.lyndendoor.com.
   7. Substitutions: See Section 01-6000 - Product Requirements.

2.02 DOORS

A. Doors: See drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Wood veneer facing for field transparent finish as indicated on drawings.
   3. Wood veneer facing for field opaque finish as indicated on drawings.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

B. Veneer Facing for Opaque Finish: Medium density overlay (MDO), in compliance with indicated quality standard.

C. Facing Adhesive: Cd 171-58 updated, Type II interior.

2.05 ACCESSORIES

A. Metal Louvers: manufactured by Anemostat or approved:
   1. Material and Finish: Roll formed steel; pre-painted finish to color as selected.

2.06 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Moisture Content: 12% maximum at time of fabrication for all wood material.

C. Solid Cores Constructed with stiles and rails:
   1. Bond stiles and rails to core.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

F. Provide edge clearances in accordance with the quality standard specified.

2.07 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
   1. Transparent:
      a. System - TR-2, Catalyzed Lacquer.
      b. Sheen: Flat.
   2. Opaque:
      a. System - OP-2, Catalyzed Lacquer.
      b. Color: As selected by Architect.
      c. Sheen: Flat.

2.08 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08-1113.

B. Metal Louvers: See Section 08-1113.

C. Door Window Frames: Door window frames with glazing securely fastened within door opening.
   1. Size: As indicated on drawings.
   2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
   3. Metal Finish: Match existing polyester powder coating.
   4. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
   5. Manufacturers:
      a. All Metal Stamping: www.allmetalstamping.com/#sle.
      b. Substitutions: See Section 01-6000 - Product Requirements.

D. Glazing: See Section 08-8000.

E. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

F. Door Hardware: See Section 08-7100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

C. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 by 84 inches surface area.

D. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches surface area.

E. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches surface area.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE

A. Refer to Door and Hardware Schedules.

END OF SECTION

SECTION 08-3613
SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Overhead sectional doors, electrically operated.

B. Operating hardware and supports.

C. Electrical controls.

1.02 RELATED REQUIREMENTS

A. Section 05-5000 - METAL FABRICATIONS: Steel channel opening frame.

B. Section 07-9005 Joint Sealers: Sealing joints between frames and adjacent construction.

C. Section 08-7100 - Door Hardware: Lock cylinders.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015, with Editorial Revision (2016).

B. ASTM C1036 - Standard Specification for Flat Glass; 2016.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

D. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

E. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; 2011.

F. ITS (DIR) - Directory of Listed Products; current edition.

G. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata, 2008.

H. NEMA MG 1 - Motors and Generators; 2014.

I. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.

C. Product Data: Show component construction, anchorage method, and hardware.

D. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.

E. Operation Data: Include normal operation, troubleshooting, and adjusting.

F. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.

C. Comply with applicable code for motor and motor control requirements.

D. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.06 WARRANTY

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

B. Extended Correction Period: Correct defective work within a 2-year period commencing on Date of Substantial Completion.

C. Manufacturer Warranty:
   1. Provide 3-year/20,000 cycle manufacturer warranty on door and electric operating equipment. Complete forms in Owner's name and register with manufacturer.
   2. Provide 1-year manufacturer warranty on door.
   3. Provide 10-year manufacturer warranty against panel delimination of foam and steel skins.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sectional Doors:
   1. Overhead Doors - Thermacore Model 596, Basis of Design.
   2. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com/#sle.
   3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Performance: Withstand positive and negative wind loads of 25 lb/sq ft without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.

B. Structural design criteria:
   1. Risk Category IV.
   2. Ultimate wind speed = 106 mph.
   3. Exposure B.
   4. Risk Category IV.
   5. Seismic Category D.

2.03 STEEL DOORS

A. Doors: Stile and rail steel with solid and glazed panels; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
   1. Door Panels: Steel construction; outer steel sheet of 20 gage minimum thickness, flush profile; inner steel sheet of 24 gauge, 0.0239 inch minimum thickness, flat profile; core reinforcement sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.
   2. Door Nominal Thickness: 2 inches thick.
   3. Exterior Finish:
      a. Factory finished with polyester baked enamel; color as selected by Architect.
   4. Interior Finish:
      a. Factory finished with polyester baked enamel; color as selected from manufacturers standard line.
   5. Thermal Resistance: R-value of 17, minimum, for overall thickness indicated.
   6. Glazed Lites: Full panel width, full aluminum sash section, one row; set in place with resilient glazing channel, insulated glass.
      a. Glazing: Annealed float glass; insulated glass units; clear; 1/2 inch nominal overall thickness.
      b. Refer to Drawings for location and layout of glazed lites.
   7. Manual Operation: Chain hoist.
   8. Electric Operation: Electric control station.

2.04 COMPONENTS

A. Track: Rolled galvanized steel, 0.090 inch minimum thickness; 3 inch wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.
   1. Low Headroom Track required, 14" clear.

B. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.

C. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
   1. For Manual Operation: Requiring maximum exertion of 25 lbs force to open.

D. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.

E. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.

F. Head Weatherstripping: EPDM rubber seal, one piece full length.

G. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.

H. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

2.05 MATERIALS

A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.

B. Float Glass: Provide float glass glazing, unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.

2.06 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
   1. Provide interlock switches on motor operated units.

B. Electric Operators:
   1. Mounting: Center mount, with draw bar type operator.
   2. Motor Enclosure:
      a. Exterior Doors: NEMA MG 1, Type 4; open drip proof.
   3. Motor Rating: 1 hp; continuous duty. Verify motor size with door size,
   4. Motor Voltage: 120 volts, single phase, 60 Hz.
   5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   6. Controller Enclosure: NEMA 250, Type 1.
   7. Opening Speed: 12 inches per second maximum, 2/3 foot per second minimum.
   8. Brake: Adjustable friction clutch type, activated by motor controller.
   9. Manual override in case of power failure.
   10. Model: Overhead Doors RHX - Basis of Design.

C. Motor: NEMA MG 1, Type 1.

D. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.

E. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
   1. 24 volt circuit.
   2. Surface mounted, at interior door jamb.
   3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
      a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.

F. Disconnect Switch: Factory mount disconnect switch in control panel.

G. Electric Operator: Side mounted on cross head shaft, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.

H. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.

I. Photo eye: Photoelectric sensors monitored to meet UL 325/2010.

J. Control Station: Standard three button (open-close-stop) momentary type control for each electric operator.
   1. 24 volt circuit.
   2. Surface mounted.
   3. Locate at inside door jamb.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

B. Verify that electric power is available and of the correct characteristics.

3.02 PREPARATION

A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.

B. Apply primer to wood frame.

3.03 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.

B. Anchor assembly to wall construction and building framing without distortion or stress.

C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware.

E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

F. Install perimeter trim.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/16 inch.

B. Maximum Variation from Level: 1/16 inch.

C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 ADJUSTING

A. Adjust door assembly for smooth operation and full contact with weatherstripping.

B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.06 CLEANING

A. Clean doors and frames and glazing.

B. Remove temporary labels and visible markings.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08-4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

D. Door hardware.

1.02 RELATED REQUIREMENTS

A. Section 08-8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

B. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems; 2014.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2016.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

G. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

I. FLA (PAD) - Florida Building Code Online - Product Approval Directory; database at www.floridabuilding.org.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

E. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

1.05 QUALITY ASSURANCE

1.06 WARRANTY

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

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum-Framed Storefronts:
1. Arcadia, Inc: www.arcadiainc.com/#sle.
2. Kawneer North America: www.kawneer.com/#sle.
3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Wind-Borne-Debris Resistance Tested:
1. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

B. Center-Set Style, Thermally-Broken:
1. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

2.03 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING

A. Center-Set Style, Wind-Borne-Debris Resistance Tested:
1. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

2.04 BASIS OF DESIGN -- SWINGING DOORS

A. Medium Stile, Monolithic Glazing:
1. Thickness: 1-3/4 inches.

B. Medium Stile, Insulating Glazing, Thermally-Broken:
1. Thickness: 1-3/4 inches.

2.05 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   2. Finish Color: As selected by Architect from manufacturer's standard line.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements
   1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
      a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, having Florida Building Code FLA (PAD) approval for Large and Small Missile impact and pressure cycling at design wind pressure.
   3. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.

2.06 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Glazing Stops: Flush.

B. Swing Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 4 inches wide.
   3. Vertical Stiles: 4-1/2 inches wide.
   4. Bottom Rail: 10 inches wide.
   5. Finish: Same as storefront.

2.07 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.08 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.09 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

E. Pivots: Center type; top and bottom.

F. Push/Pull Set: Standard configuration push/pull handles.

G. Exit Devices: Panic type.
   1. Key cylinder exterior, refer to Section 08-7100.
   2. Lever handle exterior.

H. Door Closers: Concealed overhead.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Install hardware using templates provided.

K. Install glass and infill panels using glazing method required to achieve performance criteria; see Section 08-8000.

L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.02 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.03 FIELD QUALITY CONTROL

A. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.

3.04 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

3.06 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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SECTION 08-5313
VINYL WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vinyl-framed, factory-glazed windows.

B. Factory fabricated tubular extruded plastic windows with fixed and operating sash.

C. Operating hardware.

D. Insect screens.

1.02 RELATED REQUIREMENTS

A. Section 07-2500 - Weather Barriers: Sealing frames to water-resistive barrier installed on adjacent construction.

B. Section 07-9005 - Joint Sealers: Perimeter sealant and back-up materials.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.

B. ASTM E1423 - Standard Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems; 2014.

C. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2007 (Reapproved 2016).

D. FS L-S-125 - Screening, Insect, Nonmetallic; Federal Specifications and Standards; Revision B, 1972.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage.

C. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.
   4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.06 WARRANTY

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

B. Provide lifetime year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Vinyl Windows:
   1. JeldWen Premium Vinyl Windows, V-4500 Series.
   2. Milgard Style Line, Tuscany Series.
   3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 DESCRIPTION

A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
   1. Configuration: As indicated on drawings.
      a. Product Type: C - Casement window, FW - Fixed window, H - Hung window, vertically sliding, and HS - Horizontal sliding window in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
   2. Sliding Glass Doors: Match window frame style and color.
   3. Color: Color as selected.
   4. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
   5. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
   6. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
   7. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.

B. Performance Requirements: Provide products that comply with the following:
   1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
      a. Performance Class (PC): R.
   2. Performance Validation: Windows shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements as indicated by having AAMA, WDMA, or CSA certified label, or an independent test report for indicated products itemizing compliance and acceptable by authorities having jurisdiction.

2.03 COMPONENTS

A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.

B. Windows: Extruded, hollow, tubular, ultra-violet resistant polyvinyl chloride (PVC) with integral color; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
   1. Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440 R15.
   2. Configuration: Fixed, non-operable, outward opening, top hinged, horizontal sliding, and double hung sash.
   3. Color: White.

C. Frames: Standard profile; flush glass stops of screw fastened type.

D. Insect Screens: Aluminum, extruded or roll-formed frame with mitered and reinforced corners; apply screen mesh taut to frame; secure to window with hardware to allow easy removal.
   1. Hardware: Manufacturer's standard; quantity as required per screen.
   2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's 18 x 16 mesh.
   3. Frame Finish: Manufacturer's standard, color to match window frame and sash color.

E. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.

F. Insect Screens: Woven aluminum mesh; 14/18 mesh size.
   1. Color: Black.

G. Fasteners: Stainless steel.

H. Accessories: Provide related flashings, anchorage and attachment devices as necessary for full assembly.

2.04 HARDWARE

A. Horizontal Sliding Sash: Rigid PVC interfacing tracks with dual brass wheel and stainless steel axle assembly housing, provide two sets for each operating sash and opening stops in head and sill track as required.

B. Vertical Sliding Sash: Metal and nylon spiral friction slide cylinder, provide two for each sash and jamb.

C. Sash lock: Lever handle and keeper with cam lock, provide at least one for each operating sash.

D. Finish For Exposed Hardware: Stainless Steel.

2.05 FABRICATION

A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in a rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.

B. Form snap-in glass stops, closure molds, weather stops, and flashings of extruded PVC for tight fit into window frame section.

C. Arrange fasteners to be concealed from view.

D. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.

E. Factory glaze window units.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.

C. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.

3.02 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.03 CLEANING

A. Remove protective material from pre-finished surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated.

END OF SECTION

SECTION 08-7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood and hollow metal doors.

B. Electrically operated and controlled hardware.

C. Lock cylinders for doors that hardware is specified in other sections.

D. Thresholds.

E. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

A. Section 08-1113 - Hollow Metal Doors and Frames.

B. Section 08-1416 - Flush Wood Doors.

C. Section 08-4313 - Aluminum-Framed Storefronts: Hardware for doors in storefront, including:
   1. Installation of lock cylinders provided under this section.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

B. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.

C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2017.

D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.

E. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.

F. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2014.

G. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.

H. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.

I. BHMA A156.17 - American National Standard for Self Closing Hinges & Pivots; 2014.

J. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.

K. BHMA A156.21 - American National Standard for Thresholds; 2014.

L. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012.

M. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.

N. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

O. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.

P. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.

Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

R. NFPA 101 - Life Safety Code; 2015.

S. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.

1.05 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.

C. Shop Drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements .
   2. Submit manufacturer's parts lists and templates.

D. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.

E. Keying Schedule: Submit for approval of Owner.

F. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01-6000 - Product Requirements, for additional provisions.
   2. Extra Lock Cylinders: One for each master keyed group.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL

A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Fire-Rated Doors: NFPA 80.
   3. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
   4. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
   5. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.

E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.

F. Finishes: Provide door hardware of the same finish unless otherwise indicated.
   1. Primary Interior Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
      a. Location: Interior doors.
   2. Primary Exterior Finish: Stainless steel, satin, 630.
      a. Location: Exterior doors.
   3. Finish Definitions: BHMA A156.18.
   4. Exceptions:
      a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
      b. Hinges for Fire-Rated Doors: Steel base metal with painted finish.

2.02 HINGES

A. Hinges - Basis of Design: FBB179 or FBB199, Stanley.

B. Self Closing Hinges: Comply with BHMA A156.17.

C. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.
   3. Provide hinges in the quantities indicated.
   4. Provide non-removable pins on exterior outswinging doors.
   5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

D. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7; standard weight, unless otherwise indicated.

E. Quantity of Hinges Per Door:

1. Doors up to 60 inches High: Two hinges.
2. Doors From 60 inches High up to 90 inches High: Three hinges.
3. Doors 90 inches High up to 120 inches High: Four hinges.
4. Doors 42 inches Wide up to 90 inches High: Four Hinges.

F. Manufacturers - Hinges:
1. Assa Abloy Brands; McKinney: www.assaabloydss.com.
2. Ives Architectural Hardware.
3. Bommer Industries, Inc: www.bommer.com.
4. C. R. Laurence Company, Inc: www.crl-arch.com/sle.
5. Hager Companies: www.hagerco.com.
6. Stanley Black & Decker: www.stanleyblackanddecker.com.

2.03 PUSH/PULLS

A. Push/Pulls - Basis of Design: Ives.

B. Push/Pulls: Comply with BHMA A156.6.
1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
2. On solid doors, provide matching push plate and pull plate on opposite faces.

C. Manufacturers - Push/Pulls:
1. Assa Abloy McKinney or Ives.
2. C. R. Laurence Company, Inc: www.crl-arch.com/sle.
3. Substitutions: See Section 01-6000 - Product Requirements.

2.04 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
1. Hardware Sets indicate locking functions required for each door.
2. If no hardware set is indicated for a swinging door provide an office lockset.
3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

B. Lock Cylinders: Manufacturer’s standard tumbler type, six-pin standard core.
1. Provide cams and/or tailpieces as required for locking devices required.

C. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.05 CYLINDRICAL LOCKSETS

A. Cylindrical Locksets - Basis of Design: Schlage ND Series.

B. Locking Functions: As defined in BHMA A156.2, and as follows.
1. Privacy: F76, emergency tool unlocks.
2. Office: F81, key not required to lock, remains locked upon exit.
3. Classroom: F84, key required to lock.
4. Intruder Classroom: F110, keyed both sides.
5. Communicating: F80 or F113.
6. Hotel: F93.

7. Store Room Function: F86, key required to lock, may not be left unlocked.

C. Manufacturers - Cylindrical Locksets:
1. Schlage, an Allegion brand: www.allegion.com/us.
2. Substitutions: See Section 01-6000 - Product Requirements.

2.06 MORTISE LOCKSETS

A. Mortise Locksets - Basis of Design: Schlage L Series.

B. Locking Functions: As defined in BHMA A156.13, and as follows:
1. Privacy: F19, or F02 with retraction of deadbolt by use of inside lever/knob.
a. Occupied indicator for single user toilet rooms, shower rooms.

2.07 ELECTRONIC STANDALONE KEYPAD LOCKS

A. Cylindrical Locksets - Basis of Design: Schlage AD-200 Series.

B. Match trim from typical latch/locksets.

C. Storeroom function with mechanical key override.

D. 4 AA batteries.

E. Programmable.

2.08 CLOSERS

A. Closers - Basis of Design: LCN 4010 Series, or 281 Sargent.

B. Closers: Complying with BHMA A156.4.
1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
2. Provide a door closer on every exterior door.
3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.

C. Manufacturers - Surface Mounted Closers:
1. LCN, an Allegion brand: www.allegion.com/us.
2. Substitutions: See Section 01-6000 - Product Requirements.

2.09 STOPS AND HOLDERS

A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
1. Provide wall stops, unless otherwise indicated.
2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

B. Kick Down Holder: Ives FS 452.

C. Wall Stops: Ives WS406/407CCV, concave wall bumper.

D. Door Guard: Ives 481 Change Door Guard.

E. Manufacturers - Wall and Floor Stops/Holders:
   1. Assa Abloy Brands, McKinney: www.assaabloydss.com.
   2. Ives.
      a. 407-1/2 Wall Stops.
      b. FS 452 Holdopen.
   3. Substitutions: See Section 01-6000 - Product Requirements.

2.10 GASKETING, THRESHOLDS AND DOOR PROTECTION

A. Gasketing and Thresholds - Basis of Design: Pemko.

B. Gaskets: Complying with BHMA A156.22.
   1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
      a. Pemko S88D.
   2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
      a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
      b. Pemko 303 AV.
   3. On each exterior door, provide door bottom sweep, unless otherwise indicated; 216AV Pemko.
   4. On each exterior door, provide door top; 346AV Pemko.
   5. On doors indicated as "sound-rated", "acoustical", or with an STC rating, provide sound-rated gaskets and automatic door bottom; make gaskets completely continuous, do not cut or notch gaskets for installation.
      a. Door Bottom Seal: 4301 ARL, Pemko.
      b. Threshold/carpet Seperator: 174A Pemko.
      c. Sound Seal: S88D, Pemko.

C. Thresholds: Complying with BHMA A156.21.
   1. At each exterior door, provide a threshold unless otherwise indicated, 6 inch wide typical, unless detailed otherwise.
   2. Field cut threshold to frame for tight fit.
   3. Pemko 1716 A.

D. Fasteners At Exterior Locations: Non-corroding.

2.11 PROTECTION PLATES AND ARCHITECTURAL TRIM

A. Protection Plates:
   1. Kickplate: Provide on push side of every door with closer, except aluminum storefront and glass entry doors.

B. Drip Guard: Provide projecting drip guard over all exterior doors unless they are under a projecting roof or canopy.
   1. Assa Abloy Pemko Door Top 346.

C. Manufacturers - Protection Plates and Architectural Trim:
   1. Assa Abloy Brands, McKinney: www.assaabloydss.com.

2. Ives.
3. Substitutions: See Section 01-6000 - Product Requirements.

2.12 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

A. Provide products that comply with the following:
1. Applicable provisions of Federal, State, and local codes.

2.13 KEYING

A. Door Locks: Grand master keyed.

B. Supply keys in the following quantities:
1. 2 master keys.
2. 5 grand master keys.
3. 3 change keys for each lock.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

D. Mounting heights for hardware from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Sets Schedule or on drawings.
1. For steel doors: Comply with DHI (LOCS) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".
2. For Wood Doors: Comply with DHI WDHS.3 "Recommended Locations for Architectural Hardware for Flush Wood Doors".
3. Locksets: 38 inch.
4. Push/Pulls: 42 inch.
5. Dead Locks: 42 inch.

E. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING

A. Adjust work under provisions of Section 01-7000 - Execution and Closeout Requirements.

3.04 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01-7000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

3.06 HARDWARE SCHEDULE - ATTACHED AT END OF THIS SECTION.

HARDWARE SETS

4.01 HARDWARE SETS - GENERAL

A. These Hardware Sets indicate requirements for single doors of that type, with conditional requirements for pairs and other situations.

B. Pairs of Swinging Doors: Provide one of each specified item on each leaf unless specifically stated otherwise. Treat pairs as two active leaves unless otherwise indicated.

C. HW-CYL: Doors whose hardware is specified in other sections but which must be keyed to building system:
   1. Lock Cylinder, Mortise, keyed to building system.

4.02 SWING DOORS -- NOT REQUIRING KEY LOCKING

A. HW-5: Privacy Lockset, Non-Fire-Rated:
   1. Hinges.
   2. Mortise Lockset, Privacy.
   3. Wall stop.

4.03 SWING DOORS -- KEY REQUIRED TO LOCK, MAY BE LEFT UNLOCKED

A. HW-20: Classroom Lock, Non-Fire-Rated:
   1. Lockset, Classroom.
   2. Hinges.
   3. Wall stop.

B. HW-28: Storefront Door and Frame: non-Fire-Rated:
   1. Cylinder.
   2. Remainder of Hardware per 08-4313.

4.04 SWING DOORS -- ELECTRICAL ACCESS CONTROL

A. HW-45: Classroom function, with keypad access, Non-Fire-Rated:
   1. Hinges.
   2. Keypad Lockset.
   3. Closer.

4. Kickplate.
5. Threshold.
6. Hold Open.

B. HW-55: Entrance, Non-Fire-Rated:
1. Hinges.
2. Keypad Lockset.
3. Closer.
4. Kickplate.
5. Weatherstripping.
6. Threshold.
7. Door Shoe.
8. Hold Open.

END OF SECTION

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SECTION 08-8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07-2500 - Weather Barriers.

B. Section 08-1113 - Hollow Metal Doors and Frames: Glazed lites in doors.

C. Section 08-1416 - Flush Wood Doors: Glazed lites in doors.

D. Section 08-3613 - Sectional Doors: Glazed lites in doors.

E. Section 08-5313 - Vinyl Windows: Glazing furnished by window manufacturer.

F. Section 08-8300 - Mirrors.

G. Section 10-2800 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ASTM C1036 - Standard Specification for Flat Glass; 2016.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

D. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

F. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

G. GANA (GM) - GANA Glazing Manual; 2009.

H. GANA (SM) - GANA Sealant Manual; 2008.

I. ICC (IBC) - International Building Code; 2015.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods. Maintain one copy on site.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

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

PART 2 PRODUCTS

2.01 INSULATING GLASS UNITS

A. Type IG-1 - Sealed Insulating Glass Units: Vision glass, double glazed.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
   3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
   4. Total Thickness: 1 inch.

2.02 BASIS OF DESIGN - INSULATING GLASS UNITS

A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing, with Low-E coating.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Between-lite space filled with air.
   3. Total Thickness: 1 inch.

2.03 GLAZING UNITS

A. Type IG-3 - Sealed Insulating Glass Units: Safety glazing.
   1. Application: Provide this type of glazing in the following locations:
      a. Glazed lites in exterior doors.
      b. Glazed sidelights and panels next to doors.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on the drawings.
   2. Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.

B. Type S-3 - Single Safety Glazing: Non-fire-rated.
   1. Application: Provide this type of glazing in the following locations:
      a. Glazed lites in doors, except fire doors.
      b. Glazed sidelights to doors, except in fire-rated walls and partitions.
      c. Other locations required by applicable federal, state, and local codes and regulations.

d. Other locations indicated on the drawings.
2. Type: Fully tempered float glass as specified.
3. Tint: Clear.
4. Thickness: 1/4 inch.

2.04 EXTERIOR GLAZING ASSEMBLIES

A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Design Pressure: Calculated in accordance with applicable codes.
2. Glass thicknesses listed are minimum.

B. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier:
1. In conjunction with vapor retarder and joint sealer materials described in other sections.
2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

2.05 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
2. Plastic Interlayer:

2.06 SEALED INSULATING GLASS UNITS

A. Sealed Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Edge Spacers: Aluminum, bent and soldered corners.
3. Edge Seal: Glass to elastomer.
4. Purge interpane space with dry hermetic air.

2.07 GLAZING COMPOUNDS

A. Manufacturers:
1. Bostik Inc: www.bostik-us.com.
2. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
3. Pecora Corporation: www.pecora.com.
4. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
5. Substitutions: Refer to Section 01-6000 - Product Requirements.

B. Silicone Sealant: Single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; _____ color.

2.08 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; hardness range of 5 to 30 cured Shore A durometer; coiled on release paper; black color.

D. Glazing Clips: Manufacturer's standard type.

2.09 SOURCE QUALITY CONTROL

A. See Section 01-4000 - Quality Requirements, for additional requirements.

B. Provide shop inspection for safety glass.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

E. Install sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
   1. Place glazing tape on glazing pane of unit with tape flush with sight line.

F. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

G. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.04 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

E. Trim protruding tape edge.

3.05 FIELD QUALITY CONTROL

A. Glass product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.06 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.07 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

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SECTION 09-2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum wallboard.

B. Joint treatment and accessories.

C. Prime paint on walls and ceilings to receive textured finish.

D. Textured finish system.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 07-2100 - Thermal Insulation: Acoustic insulation.

C. Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.

D. Section 07-9005 - Joint Sealers: Acoustic sealant.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).

C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2017a.

D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2016.

E. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2013a.

F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

G. GA-216 - Application and Finishing of Gypsum Board; 2016.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Section 01-7419 - Construction Waste Management and Disposal for packaging waste requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum: www.americangypsum.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. Georgia-Pacific Gypsum: www.gpgypsum.com.
   4. Substitutions: See Section 01-6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
   3. Mold-Resistant, Paper-Faced Products:
      a. CertainTeed Corporation; ProRoc Brand Moisture & Mold Resistant Gypsum Board.
      b. Substitutions: See Section 01-6000 - Product Requirements.

C. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 5/8 inch.
   3. Edges: Tapered.

2.03 GYPSUM BOARD ACCESSORIES

A. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

B. Textured Finish Materials: Latex-based compound; plain. Match existing texture.

C. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

D. Adhesive for Attachment to Wood ASTM C557 and Wood ASTM C557:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Studs: Space studs per Structural Drawings.

1. Extend partition framing to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

B. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

C. Blocking: Install wood blocking for support of:
1. Framed openings.
2. Wall-mounted cabinets.
3. Plumbing fixtures.
4. Toilet partitions.
5. Toilet accessories.
6. Wall-mounted door hardware.

3.03 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
1. Single-Layer Applications: Screw attachment.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Corner Beads: Install at external corners, using longest practical lengths. Profiles to match existing.

B. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

3.06 TEXTURE FINISH

A. Prime paint prior on all walls and ceilings designated to receive spray textured finish.

B. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

C. Texture Required: Light orange peel texture, match existing.

3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.08 CLEANING

A. See Section 01-7000 - Execution and Closeout Requirements for additional requirements.

3.09 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 09-6500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient tile, Luxury Vinyl Tile (LVT) flooring.

C. Cove base.

D. Resilient base.

E. Resilient stair coverings and accessories.

F. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 03-3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

B. INTERIOR FINISH SCHEDULE located in Drawings.

1.03 REFERENCE STANDARDS

A. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2017.

B. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2014).

C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.

D. ASTM F2034 - Standard Specification for Sheet Linoleum Floor Covering; 2008 (Reapproved 2013).

E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01-6000 - Product Requirements, for additional provisions.

1.05 FIELD CONDITIONS

A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 SHEET FLOORING

A. Vinyl Sheet Flooring Type RS-1: Color and pattern throughout wear layer thickness, with backing, and:
   1. Wear Layer Thickness: 20 mil, (2.0 mm).
   2. Total Thickness: 080 inch minimum.
   3. Sheet Width: 72 inch minimum.
   4. Static Load Resistance: 750 psi minimum, when tested as specified in ASTM F970.
   5. Heat welded seams with color matched rod.
   6. Integral coved base with cap strip, as scheduled.
   7. Manufacturers:
      a. Mohawk Group; Product Geomorphic.
      b. Or approved. See Section 01 6000 - Product Requirements.

B. Vinyl Welding Rod: Solid vinyl bead produced by manufacturer of vinyl flooring for heat welding seams, in color matching field color.

2.02 TILE FLOORING

A. Luxury Vinyl Tile (LVT): Surface-decorated, with wear layer.
   1. Manufacturers:
      a. Milliken.
      b. Substitutions: See Section 01-6000 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
   3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   4. Tile Size: 18 by 18 inch.
   5. Wear Layer Thickness: 20 mil, (2.0 mm).
   6. Total Thickness: 0.100 inch.
   7. Color: As indicated on drawings.
   8. Style: Milliken "DISTRICT" Midtown Village
      a. Or approved.See Section 01-6000 - Product Requirements.

2.03 RESILIENT BASE

A. Resilient Base (RBR1): ASTM F1861; top set Style B, Cove.
   1. Manufacturers:
      a. Burke Flooring: www.burkeflooring.com.
      b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.

c. Roppe Corp: www.roppe.com/#sle.
d. Substitutions: See Section 01-6000 - Product Requirements.
2. Height: 4 inch.
3. Color: see Finish Schedule.

2.04 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

C. Moldings, Transition and Edge Strips: Same material as flooring.

D. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is fully cured.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints and butt seams tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.

B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.

C. Seal seams by heat welding where indicated.

D. Double cut sheet at seams.

E. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.

F. Finish seams in sheet vinyl by heat welding.

G. Coved Base: Install as detailed on drawings and Room Finish Schedule, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.

3.05 RESILIENT TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Spread adhesive with notched trowel. Place tile carefully and accurately to avoid repositionin. Roll each sectino immeditately, in both directions with a minimum 100 lb. three-section roller, the re-roll entire floor, in both directions with 1 hour. Hand roll in areas that cannot be reached with a big roller.

C. Prohibit furniture, fixtures, wash or wax on floor for minimum of 48 hours after installation complete.

D. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

E. Install square tile to directed pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

F. Install plank tile with a random offset of at least 6 inches from adjacent rows.

3.06 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.07 INSTALLATION - STAIR COVERINGS

A. Install stair coverings in one piece for full width and depth of tread.

B. Adhere over entire surface. Fit accurately and securely.

3.08 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.09 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

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SECTION 09-7800
INTERIOR WALL PANELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Decorative plastic wall paneling.

B. Accessories.

1.02 REFERENCE STANDARDS

A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010, with Editorial Revision (2015).

B. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2017.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.03 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's descriptive literature for each specified product. Include anchorage devices specific to project substrate types.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in manufacturer's original packaging, marked with manufacturer's product identification.

B. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Decorative Plastic Wall Paneling:
   1. Crane Composites, Inc; Glasbord with Surfaseal: www.glasbord.com.
   2. Marlite, Inc; FRP: www.marlite.com/#sle.
   3. Nudo Products, Inc; FiberLite FRP: www.nudo.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Surface Burning Classification: Provide wall paneling assemblies meeting Class C when tested in accordance with ASTM E84.

2.03 DECORATIVE PLASTIC WALL PANELING

A. Fiberglass Reinforced Plastic (FRP) Wall Panels, available in textured and smooth surfaces, provide ultimate durability, satisfying the most stringent demands, water-resistant, low maintenance material.
   1. Panel Size: 4 by 8 feet.
   2. Panel Thickness: .090 inch.
   3. Smooth surface.
   4. Material: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
      a. Impact Strength: Greater than 6 ft lbf/in, when tested in accordance with ASTM D256.
   5. Edges: Square.

B. Accessories:
   1. Trim:
      a. Material: PVC.
      b. Color/Finish: Match panel color.
      c. Divider Bars: Manufacturer's standard, matching and aligning with design pattern.
      d. Inside Corner Trim: Standard angle.
      e. Outside Corner Trim: Standard angle.
      f. Edge Trim: Manufacturer's standard shape.
   2. Adhesive: Type recommended by panel manufacturer.
   3. Sealant: Type recommended by paneling manufacturer; clear.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces for adhered items are clean and smooth.
   1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer.

B. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

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

B. Apply adhesive to back side of panel using trowel recommended by adhesive manufacturer.

C. Apply panels to wall with vertical joints plumb and horizontal joints level and pattern aligned with adjoining panels.

D. Using a roller, apply pressure to panel face to ensure proper adhesion between surfaces.

E. Install panels with manufacturer's recommended gaps for panel field and corner joints.

F. Fill channels in trim with sealant before mounting to panel.

G. Install trim with adhesive.

H. Seal joints at wall base and between panels with approved sealant to prevent moisture intrusion.

I. Remove excess sealant after paneling is installed and prior to curing.

3.03 PROTECTION

A. Protect installed interior wall paneling from subsequent construction operations.

END OF SECTION

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SECTION 09-8430
SOUND-ABSORBING WALL AND CEILING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sound-absorbing panels.

1.02 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2017.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests; 2016.

1.03 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements for submittal procedures.

B. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.

C. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.

D. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.

B. Store units flat, in dry, well-ventilated space; do not stand on end.

C. Protect edges from damage.

PART 2 PRODUCTS

2.01 POLYESTER DIRECT ATTACHED ACOUSTICAL UNITS

A. Manufacturers:
   1. Acoustic Surfaces, Inc., www.acousticalsurfaces.com
   2. Substitutions: See Section 01-6000 - Product Requirements.

B. Semi-Rigid Board for Ceilings:
   1. Sound Absorption: Noise Reduction Coefficient (NRC) of 0.70-0.85 when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795.

2. Density: 7.5 lb/cu ft.
3. Surface Burning Characteristics: Flame Spread Index of 25, maximum; Smoke Developed Index of 50, maximum; when tested in accordance with ASTM E84.
4. Color: Black.
5. Anchors and fasteners: Type recommended by wall covering manufacturer to suit application.

2.02 FABRICATION

A. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and squareness from corner to corner.

2.03 ACCESSORIES

A. Fixing Clips: Manufacturers standard for application as indicated.

B. Panel Adhesive: Acceptable to acoustical panel manufacturer for application as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.

B. Install mounting accessories and supports in accordance with shop drawings.

C. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.

D. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
1. Plumb and level.
2. Flatness.

3.03 CLEANING

A. Clean sound-absorptive panels upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.04 PROTECTION

A. Provide protection of installed acoustical panels until Date of Substantial Completion.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09-9000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Prep and paint existing prefinished metal wall panels, flashings, gutters, downspouts designated on the Drawings to remain.

D. Do Not Paint or Finish the Following Items:
1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
2. Items indicated to receive other finishes.
3. Items indicated to remain unfinished.
4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
5. Floors, unless specifically so indicated.
6. Glass.
7. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

C. Samples: Submit two paper chip samples, 8x8 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01-6000 - Product Requirements, for additional provisions.

2. Extra Paint and Coatings: 1 gallon of each color; store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
1. Benjamin Moore & Co, www.benjaminmoore.com.
2. Sherwin-Williams.

C. Transparent Finishes:

D. Stains:
1. Same as above.

E. Primer Sealers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
1. Same as above.

F. Substitutions: See Section 01-6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - All Exterior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry, and cement board.
   1. Preparation as specified by manufacturer.
   2. Two top coats and one coat primer recommended by manufacturer.
   3. Exterior Satin (Acrylic): One coat applied at a dry film thickness of 2.8 mils, prime as recommended by manufacturer.

B. Paint WE-OP-3L - Wood, Opaque, Latex, 3 Coat - unfinished wood trim, soffits:
   1. One coat of latex primer sealer.
   2. Semi-gloss: Two coats of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170 applied at dry film thickness of not less than 1.1 mils per coat.

C. Paint WE-OP-2L - Wood, Opaque, Latex, 2 Coat - Preprimed Siding & Trim:
   1. One coat of latex primer sealer - touch up as needed on bare surfaces, end cuts, etc.
   2. Semi-gloss: Two coat of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.

D. Paint WE-TR-VS - Wood, Semi-Transparent Stain:
   1. Two coats of stain; Moorwood Alkyd Semi-Transparent Deck & Siding Stain.
   2. One coat sealer .

2.04 PAINT SYSTEMS - INTERIOR

A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer.
   2. Semi-gloss: Two coats of latex enamel; Benjamin Moore Paints; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than 1.2 mils per coat.

B. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of latex enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

C. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
   1. One coat of Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils primer sealer.
   2. Eggshell: Two coats of latex enamel; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils per coat.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

G. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

H. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

I. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

J. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

K. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

L. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

M. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.

N. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.

O. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

P. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's instructions.

D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

F. Apply each coat to uniform appearance.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

3.06 SCHEDULE - COLORS

A. All colors to be approved by Architect.

B. Doors and Door Frames:
   1. One (1) Coat Primer.
   2. Two (2) Coats Finish.

END OF SECTION

SECTION 10-1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs.

B. Exterior Building identification signage.

C. Plaque.

1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flat Signs:
   1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
   2. Cosco Industries (ADA signs); ADA Series 1: www.coscoarchitecturalsigns.com/#sle.
   3. Inpro: www.inprocorp.com/#sle.
   4. Mohawk Sign Systems, Inc: www.mohawksign.com/#sle.
   5. Gemini Signs.
   6. Substitutions: See Section 01-6000 - Product Requirements.

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with engraved panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. Character Height: 1 inch.
   4. Sign Height: 4 inches, unless otherwise indicated.
   5. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
   6. Rest Rooms: Identify with pictograms, the name "RESTROOM" with combo pictogram and braille.

C. Building Identification Signs:
   1. Use individual cast metal letters, prefinished.
   2. Mount on outside wall in location indicated on Drawings.

D. Plaque:
   1. Cast bronze, 18 inches wide by 13 inches high, beveled edges, with etched logo insert.
   2. Content to be provided by Architect.
   3. Mount on inside wall in location indicated on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 10-2601
WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.

1.02 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate physical dimensions.

C. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall and Corner Guards: See Section 09-0502 Finish Materials.
   1. Construction Specialties, Inc: www.c-sgroup.com/#sle.
   2. Inpro: www.inprocorp.com.
   3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 COMPONENTS

A. Corner Guards - Surface Mounted:
   1. Material: High impact vinyl with full height extruded aluminum retainer.
   2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
   3. Width of Wings: 2 inches.
   4. Corner: Square.
   5. Color: As selected from manufacturer's standard colors.
   6. Length: One piece.

2.03 FABRICATION

A. Fabricate components with tight joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Verify that field measurements are as indicated on drawings.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.

B. Position corner guard 4 inches above finished floor to 48 inches high.

END OF SECTION

SECTION 10-2800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Grab bars.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASTM C1036 - Standard Specification for Flat Glass; 2016.

C. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. AJW Architectural Products: www.ajw.com/#sle.
   2. American Specialties, Inc: www.americanspecialties.com/#sle.
   3. Bradley Corporation: www.bradleycorp.com/#sle.
   4. Georgia-Pacific Professional: www.gppro.com/#sle.
   5. Substitutions: Section 01-6000 - Product Requirements.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

B. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

A. Toilet Paper Dispenser: Single roll, surface mounted bracket type, stainless steel, spindleless type for tension spring delivery designed to prevent theft of tissue roll.

B. Paper Towel Dispenser: Electric, roll paper type.
   1. Cover: Transparent.
   2. Paper Discharge: Touchless automatic.
   3. Mounting: Surface mounted.
   4. Power: Battery operated.
   5. Refill Indicator: Illuminated refill indicator.

C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.

D. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.

E. Seat Cover Dispenser: Stainless steel, surface-mounted, reloading by concealed opening at base, tumbler lock.
   1. Minimum capacity: 250 seat covers.

F. Grab Bars: Stainless steel, smooth surface.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force, minimum.
      b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
      c. Finish: Satin.
      d. Length: 42, 36, and 18 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

D. See Section 06-1000 Rough Carpentry for installation of blocking in walls and ceilings.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Mirrors: 40 inch, measured from floor to bottom of mirrored surface.
   2. Other Accessories: As indicated on drawings.

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

3.05 SCHEDULE

A. SINGLE USER TOILET ROOM:
   1. (1) 36 inch grab bar
   2. (1) 42 inch grab bar
   3. (1) 18 inch grab bar
   4. (1) Soap Dispenser
   5. (1) Paper Towel Dispenser
   6. (1) Seat Cover Dispenser
   7. (1) Toilet Paper Dispenser
   8. (1) Mirror - 24w x 36h

END OF SECTION

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SECTION 22-0100
PLUMBING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pipe and pipe fittings, valves - water and gas piping.

B. Plumbing Specialties: Cleanouts, hose bibs/hydrants.

C. Plumbing fixtures.

D. Plumbing Equipment.

E. Provide material, labor and equipment required for complete plumbing system.

F. Codes: Install in complete compliance with all codes and regulations. Obtain and pay for all permits and fees applicable to this work.

1.02 SUBMITTALS

A. Product Data: Provide complete catalog data for all plumbing specialties, fixtures and equipment.

1.03 RELATED WORK

A. Project Record Documents: Section 01-7800.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Sanitary Sewer. ABS Schedule 40 plastic sewer pipe and fillings, ASTM D2680 or D2751, Solvent amount ASTM D2235 at joints.

B. Water. Seamless copper tube and fittings, hard drawn, Type L, ASTM B88.76 with ASTM B16.29 wrought copper fittings, 150 psi rated, solder type, ASTM B52 Grade 95TA.

2.02 PLUMBING FIXTURES & MATERIALS

A. Cleanouts:
   1. Manufacturer: J.R. Smith, Zurn, Wade, Ancon, or approved substitute.
   2. Types:
      a. Concrete Floor Cleanout: Smith 4023 with round heavy-duty nickel bronze top.
      b. Wall Cleanouts: Smith 4472-U, bronze ferrule with raised head bronze plug, stainless steel shallow cover and vandalproof screws.

B. Priming Valves: Smith 2699, Wade W8800T, Zurn Z1022, Ancon MS810 or equivalent Precision Plumbing. Locate in closets, under counters or in walls behind Milcor or access panels. Use copper specified in Section 15060, Pipe & Pipe Fittings, for all underground priming lines

C. Stops: Furnish stop valves for all fixtures. Loose key style, in wall, angle or straight through pattern to fit installation. Stops to be all brass with full turn brass stem and replaceable washer, no plastic. Compression nuts to be high copper content brass. Finish to be copper nickel chrome plate. Product to carry manufacturer's name. Risers to be chrome plated copper. McGuire, Chicago, Brasskraft, or approved substitute.

D. 1.6 Gallon Flush Water Closet, Tank Type, Vitreous China, "WC-1": Water closet bowl shall be designed for 1.6 gallon siphon jet flushing action.
   1. Seat: Solid white heavy weight molded plastic seat, with moldedin bumpers; open front less cover for elongated bowl with check and self-sustaining hinge. Hinge and hardware to be 300 series stainless steel. Church, Beneke, Olsonite.
   2. Floor Mounted, 18" High "WC-1": American Standard or equal.
   3. Location: Unisex Restrooms.

E. Lavatory, Vitreous China:
   1. Faucet: Battery powered sensor activated electronic hand washing faucet for tempered or hot/cold water operation, 0.5 gpm flow rate with vandal resistant spray head with pressure compensating flow control, with BDM and BDT variatino mixing valves for hot/cold supply, below deck thermostatic mixing valve, ADA compliant. Sloan Optima Systems Optima Plus Battery Powered Hand Washing Faucet, Model EBF-85.
   2. Wall Hung, 20" x 18" Size, "LV-1": Provide with concealed arm hangers and wall backing plate (J.R. Smith, Wade, Ancon, or Zurn). American Standard 0356.012 or equal, with extra hole right of faucet for soap dispenser. Provide with chrome finish dispenser.
   3. Provide handicap piping protector kit on all exposed accessible fixture traps and supplies (I&S Insulation Co. Inc., Brocar Products Inc. kit 500R, McGuire "Prowrap", Plumberex "Pro-2000" or approved substitute.
   4. Location: Unisex Restrooms.

F. Break Room Sink:
   1. Type 304, 18 gauge, self-rimming stainless steel sink installed with stainless steel crumb cup strainer outlet unless noted otherwise, and flange tail piece. Dayton Elite Double Bowl Sink, DSE or equal. Faucet: Monterrey, two handle top-mount kitchen faucet - 6405.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside piping before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Coordinate cutting or forming of roof or floor construction to receive drains to required invert elevations.

E. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

F. Verify adjacent construction is ready to receive rough-in work of this Section.

3.02 INSTALLATION

A. Provide dielectric connections wherever jointing dissimilar metals.

B. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations.

C. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

D. Provide clearance for installation of insulation and access to valves and fittings.

E. Slope water piping and arrange to drain at low points.

F. Install bell and spigot pipe with bell end upstream.

G. Install specialties in accordance with manufacturer's instructions.

H. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

I. Install water hammer arresters complete with accessible isolation valve.

J. Install each fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.

K. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise or overflow.

L. Install fixtures in strict accordance with manufacturer's instructions. Set level and plumb.

M. All fixtures in contact with finished walls shall be caulked with waterproof, white, non-hardening sealant which will not crack, shrink or change color with age.

3.03 CLEANOUTS

A. Where required by code, at each change of sewer direction 45 degrees or greater and more than 10' long, at end of each branch or main and spaced not greater than 100' apart, as required by code and/or as shown on Drawings.

3.04 APPLICATION

A. Use grooved mechanical couplings and fasteners, and dielectric connections 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. Sweat solder adapters to pipe.

D. Remove all labels and tags. Refer to Final Cleaning: Section 01-7000.

END OF SECTION

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SECTION 26 0500
BASIC ELECTRICAL MATERIALS & METHODS

PART 1 - GENERAL

1.01 Description

A. Furnish labor, supervision, permits, materials and equipment to complete the work required in Division 26 and by the contract documents.

B. It is the intention of this Section of the Specifications and the accompanying drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown on the Plans.

1.02 Contract Documents

A. The Contract Documents are complimentary, and what one affecting this Division requires shall be binding as if repeated herein.

B. Separation of this Division from other Contract Documents shall not be construed as complete segregation of the work.

C. Electrical work shall include both this Division as well as other Divisions as applicable, such as:

1. Division 27, Communications

2. Division 28, Safety & Security

3. Division 33, Utilities.

1.03 Codes

A. Meet requirements of State of Oregon Electrical Specialty Code, Oregon Administrative Rules Chapter 437, American Society of Testing and Materials (ASTM) Federal Specifications, American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratory (UL), National Electrical Code, National Electrical Safety Code, all rules and regulations of the local serving utility, National Board of Fire Underwriters and Oregon Structural Specialty Code. All Codes, rules, and regulations shall be the current or latest edition adopted by authorities having jurisdiction at time of permit.

B. Code requirements shall be considered a minimum guide for the work. Where contract documents require work materials in excess of Code minimum, install work as called for in contract documents.

1.04 Permits, Licenses And Taxes

A. The Contractor shall obtain and pay for all licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. The Contractor shall arrange for inspection of work by the inspectors and shall give the inspectors all necessary assistance in their work of inspection. Division 26 Contractor shall make all necessary arrangements for installation of electrical services indicated on plans.

B. Utility installation fees will be paid by the Owner.

1.05 Layout And Coordination

A. See General Conditions.

B. Before starting work, carefully examine Architectural, Civil, Landscape, Structural, Plumbing, Heating, Ventilating and Air Conditioning Drawings to become thoroughly familiar with conditions governing work on this project. Verify elevations, measurements, rough-in requirements of equipment and its installation location before proceeding with the work. Install equipment with access as required by NEC.

C. Composite Interference Drawings. Before any sleeves or inserts are set or any electrical equipment or foundations are installed, prepare and submit for approval, by the Engineer, in accordance with the

General Provisions, composite coordination drawings for all equipment rooms, spaces and other areas in which the probability of interference exists. Drawings shall show the work of all trades covered, shall be drawn to a scale not smaller than 1/2" = 1'-0", and shall show clearly in both plan and elevation that all work can be installed without interference.

D. Prior Installation. Any electrical work installed prior to approval of coordination drawings shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Owner. In case interference develops, the Engineer will decide which work shall be relocated, regardless of which was installed first.

E. The existence of any wires, conduits, pipes, ducts or other service facilities is shown in a general way only. The Contractor is responsible for making the exact determination of the location and condition of these facilities.

F. The Drawings indicate outlet and equipment locations, directions and locations of branch circuit wiring and homeruns. Verify all locations with actual field conditions.

G. The horsepower of motors and apparatus wattages indicated on the plans and in the panel schedules are estimated requirements of equipment furnished under other Divisions of this contract and bid shall be based on these sizes. Overload elements, contactors, circuit breakers, fuses, conductors, etc., shall be furnished to suit actual equipment installed. Advise Engineer of any equipment changes affecting electrical circuits.

H. The location of utilities indicated on the plans is taken from existing public records. The Contractor must determine the exact location and elevation of public utilities. The Contractor shall ascertain whether any additional facilities other than those shown on the Drawings may be present.

I. The general directions and location of homeruns are indicated on Drawings and are to be extended to panels as though routes were completely shown. No homeruns or branch circuits are to be combined. Items which are installed other than as shown on Drawings and without receiving prior written approval will be ordered removed and installed as shown without additional cost to Owner.

J. Owner shall not be responsible for any loss of unanticipated costs that may be suffered by the successful bidder as a result of such bidder’s failure to fully inform himself in advance in regard to all conditions pertaining to the work and character of the work.

K. Coordinate work with other crafts employed on the project. Should rearrangement or relocation of equipment be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no condition are beams, girders, footing or columns to be cut for electrical items unless so shown on Plans or written approval is obtained from the Architect or Engineer.

L. Special attention shall be given for the following items and all conflicts shall be reported to the Engineer before installation for decision and correction:

1. Door swings; switches shall be located on the "strike" side of the door.
2. Location of radiators, grilles, pipes, ducts and other mechanical equipment so that all electrical outlets, lighting fixtures and other electrical outlets and equipment are clear from and in proper relation to these items.
3. Location of cabinets and counters so that electrical outlets and equipment are clear from and in proper relation to these items.
4. Within the limits indicated on the drawings, the maximum practicable space for operation, repair, removal and testing of equipment shall be provided.
5. Contractor shall coordinate with HVAC installer (if separate from the Contractor) to wire the HVAC system when the installer is ready for power.

M. Contractor shall consult the Architectural drawings for the exact height and/or location of all outlets, switches, lights, etc. specified herein or on the drawings.

N. Outlet locations shown on the drawings are approximate. Contractor shall study the building drawings in relation to spaces and equipment surrounding each outlet so that the lighting fixtures are symmetri-

cally located according to ceiling tile and room layout. When necessary, with the Engineer's approval, outlet shall be relocated to avoid interference with structural features of the building.

O. Call to the attention of the Architect any error, conflict or discrepancy in Plans and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made.

P. Supplementary Details and Plans may be supplied as required and they will become a part of the Contract Documents. The Architect or Engineer reserves the right to make minor changes prior to installation of specific electrical systems in the location of the conduits, outlets, etc., from those shown on the plans without extra charge to the Owner.

Q. Arrange work to reduce interruption of any existing service to minimum. When interruptions are unavoidable, consult Owner or Utility involved and agree in writing, with copy to the Architect, upon a mutually satisfactory time and duration.

1.06 Substitution Requests

A. Substitution of Equipment. (Prior To Bid).

1. Bids shall be based only upon the materials, construction and equipment specifically identified in the bidding documents, except as hereinafter provided.

2. If Contractors wish to use items of equipment other than those named in their base bid, Contractor shall apply in writing to the Engineer for approval of substitution at least 10 days prior to opening of bids, submitting with his request for approval complete descriptive and technical data on the items he proposes to furnish.

3. Equipment and materials proposed for substitution shall be similar in design and equal in quality and function to those specified.

4. Submittal shall be in triplicate with identification of the item to be substituted and clearly marked with all pertinent data depicting proper characteristics of proposed item.

5. Contractor's description of his proposed substitution shall specifically note all differences between the item specified and the proposed substitution.

6. If the Engineer approves any proposed substitution, such approval will be set forth in an Addendum or in writing to the person submitting equipment for approval.

7. Where a substitution alters the design or space requirements indicated, Contractor shall include all items of cost for the revised design and construction including cost of all allied trades.

8. Unless requests for changes in base bid specifications are received and approved prior to the opening of bids, as defined above, the successful Contractor will be held to furnish specified items under his base bid. After Contract is awarded, changes in specifications will be made only as defined under Substitution of Equipment. (After bid).

B. Substitution of Equipment or Materials. (After Bid).

1. After execution of the Contract, substitution of equipment or makes other than those specifically named in the Contract Documents will be approved by the Engineer for the following reasons only:

2. That the equipment proposed for substitution is equal to and/or superior to equipment named, in construction, efficiency and utility, and further that the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence to work of other Contractors, due to conditions beyond the control of the Contractor.

3. To receive consideration, requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed equipment.

4. In case of a difference in price, the Owner shall receive all benefit of the difference in cost involved in any substitution and the Contract altered by Change Order to credit Owner with any savings so obtained.

1.07 Submittals: Shop Drawings And Material Lists

A. In addition to the requirements of General Conditions of Division 01, submit manufacturers data and Shop Drawings and Material Lists as required by individual sections of Division 26 (and otherwise associated Divisions).

B. Before commencing work and within 30 days after award of contract, furnish six (6) copies of complete Shop Drawings and Material Lists to the Architect or Engineer.

C. Include only information on exact equipment installed; not complete "line" of manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for systems to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.

D. Single Submission. Data and shop drawings shall be supported and included in a single submission. Multiple submissions are not acceptable except where prior approval has been obtained from the Engineer. In such cases, a list of data to be submitted later shall be included with the first submission.

E. Shop Drawings. Shop drawings shall include complete construction details, dimensions, material descriptions, diagrams or pictures showing physical characteristics, performance and test data, description of operation, installation methods, wiring diagrams and any other data or information necessary for a complete evaluation. (Note: do not re-draw the contract drawings. The drawings to be submitted under this subsection are all the supplemental drawings and manufacturers' specification drawings which are not included in the contract drawings.) Shop drawings are in addition and supplemental to the contract drawings.

F. Identification. In addition to the requirements of Special Provisions, submittals shall be identified by the name of the system and applicable specification paragraph number.

G. Delivery Prior to Approval. No item of material or equipment shall be delivered to the site or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer.

H. Compliance. Should the Contractor fail to comply with the requirements of these provisions, the Engineer reserves the right to select any or all items of materials and systems. Selection shall be final and binding upon the Contractor. Materials so selected or approved shall be used in the work at no additional cost to the Owner.

I. Departures. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the drawings. Where such departures require raceways or equipment to be supported otherwise than as shown, the details submitted shall include loadings and type and kind of frames, brackets, stanchions, or other supports necessary. Approved departures shall be made at no additional cost to the Owner.

J. Electrical Diagrams. A complete electrical connection diagram for each item of equipment furnished under Division 26, which has electrically controlled components having more than one automatic or manual control device, shall be submitted for approval. Wiring diagrams shall identify each component, and one diagram shall show all interconnected or interlocked components. It is understood that the contract electrical drawings do not have to be submitted or copied for inclusion in this submittal.

K. Contractor agrees that submittals processed by the Engineer are not change orders; that the purpose of submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

L. Late submittals will not be considered an excuse for time extension for the project.

M. Data not in conformity with these requirements will be returned for resubmittal.

N. Organization:

1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Provide cover with permanently attached typewritten or printed label with name of project, job number and heading reading "ELECTRICAL SUBMITTAL DATA".

2. Organize data in each set in basic categories listed in index for Division 26 (and otherwise associated Divisions). Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26 (and otherwise associated Divisions). In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.

3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.08 Electrical Equipment Operation and Maintenance Manuals

A. In addition to the requirements of the General Conditions of Division 01, submit manuals as required by individual Sections of Division 26 (and otherwise associated Divisions).

B. Provide all electrical equipment and control information. The purpose of this manual is to provide one comprehensive document that illustrates and describes all the electrical equipment and instrumentation installed in the plant.

C. For final acceptance of Division 26 work, provide to the Architect or Engineer six (6) copies of complete electrical operating and maintenance manuals for servicing of all equipment installed.

D. Information included must be exact equipment installed, not complete "line" of manufacturer. Where sheets show equipment installed as well as other equipment, identify installed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for each system to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.

E. Information shall include all revisions noted in shop drawings. Copies of stamped drawings are not acceptable.

F. Provide General Contractor’s name, contact person, telephone/fax numbers, include similar information for the sub-contractors.

G. Include all electrical devices provided under all Divisions. Coordinate with other Division Contractors. The Contractor shall coordinate with the Division 17 contractor and the Software Integrator to include pertinent documentation from their responsibilities in this submittal.

H. Manuals and documentation shall include calibration curves of every sensing device and a programming documentation sheet for every programmable device. The programming documentation sheet shall show the final operational value of every programmable parameter of every device. The purpose of this sheet is to provide maintenance personnel with a convenient source of information for programming the parameters of a replacement device should the old device fail.

I. Organization:

1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Contractor shall insert printed spine and cover title sheets to match font style and size of the rest of the plant O&M manual set. Coordinate with the General Contractor.

2. Organize data in each set in basic categories listed in index for Division 26. Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26. In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.

3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.09 Project Record Drawings

A. Maintain at the site one complete set of full-sized original prints for recording installed conditions (As-Builts). Keep record Drawings clean, undamaged and up to date as work progresses. Accurately indicate electrical work as actually installed with indications of all deviations, additions and omissions in red ink. Locate all buried exterior raceways or cables by actual dimensions from walls, center-lines or fixed points of reference.

B. The purpose of these Record drawings is to provide the Engineer with an easy to read, complete record of the installation so that at the end of the project the Engineer can revise the original contract drawings to represent the actual installation. Color-coded and highlighted notes shall be used if these would make the Record Drawings easier to read.

C. At the completion of the work, Contractor shall furnish the Engineer this original set of marked-up drawings. Final payment to the Contractor will not be authorized until these drawings have been submitted to and accepted by the Engineer.

1.10 Certificates

A. For final acceptance of Division 26 work (and that of otherwise associated Divisions), provide certificate of approval from the applicable regulatory and permitting agencies certifying that the electrical work has been inspected and that the work conforms with the minimum requirements of the State Electrical Codes.

1.11 Warranty

A. See Division 01.

PART 2 - PRODUCTS

2.01 Materials

A. Unless otherwise specified, all material to be new of recent manufacture, carrying full factory warranty, UL approved or approved by local inspection authority.

B. All like materials shall be by the same manufacturer throughout the project.

C. All material shall be new and bear manufacturer's name, model number, electrical characteristics and other identification and shall be the standard product of manufacturer regularly engaged in production of similar material.

D. Access Panels:

1. Provide access panels of adequate size for equipment requiring service and installed above plaster or gypsum board ceilings, behind walls or in furring.

2. Furnish complete with correct frame for type of building construction involved. Size, number and location of access panels is not necessarily shown on Drawings.

3. Use no panel smaller than 12 inches by 12 inches for simple manual access, nor smaller than 16 inches by 20 inches where personal must pass through.

4. Access panels shall maintain ceiling fire rating.

5. Acceptable Manufacturers: Milcor A, K, L, or M panels or equivalent Bilco or Potter - Roemer as required by construction.

PART 3 - EXECUTION

3.01 Excavation/Trenching

A. Provide trenching, backfilling, compaction, repaving or other site restoration as required by the work done in this Division.

B. Determine location of all existing underground gas, water, sewer, telephone and electric lines. Locate accurately on ground surface and for depth of same before excavation. Uncover by hand digging.

Contractor shall be responsible for any damage or interruptions to these utilities, caused by himself, and other costs incurred by these interruptions.

C. Do not undermine footings or bearing walls.

D. Use power-digging equipment only in direction away from existing facilities.

E. Exercise standard safety precautions in excavation near power cables by using insulated handles, rubber gloves and footwear, etc.

F. Do not place backfill until installation to be covered has been tested, inspected and approved.

G. Minimum conduit burial depth shall be 24 inches, unless otherwise noted.

H. Install a detectable six inch wide yellow vinyl tape with letter “Caution: Buried Electrical Line Below” 18 inches above all buried services conduit and wire not under structures.

I. Backfill:

1. Backfill material for all trenches under paved areas shall be coarse sand or crushed rock, installed in layers not to exceed six inches and compacted to 95% of maximum density at optimum moisture content to preclude subsequent settlement.

2. The top 18 inches of trenches in landscaped or grassed areas shall be backfilled with native soil and tamped.

J. Conduits piercing a building waterproof membrane shall be provided with flanges, using two neoprene washers, one washer on each side of membrane, between each flange and membrane.

K. All underground conduits which enter the building penetrating poured-in-place slabs:

1. Shall be sloped to drain away from the building and shall be water sealed to prevent moisture from passing through the conduit into the building. All joints to be threaded and taped or glued to prevent entry of water into the conduits.

2. Shall be poured-in-place, or provide with watertight conduit sleeves and rubber seals, Linkseal system by Thunderline Corporation or equivalent.

3. Shall be rigid galvanized steel a minimum of 12-inches under the slab and 6-inches above the slab.

3.02 Cutting

A. Perform or arrange and pay for required cutting of concrete, masonry, wood, structural framing, etc.

B. Cutting or channeling of underpinning or structural members is not permitted without prior permission of the Engineer.

C. No weakening of structural parts is permitted and the Contractor will correct any work impaired.

3.03 Patching

A. Where trenching is done through existing paving, walks, curbs, etc., the Contractor is responsible to patch and repair these structures to original condition.

B. Patch all openings in and through concrete and masonry with dry pack.

C. In new work, patch and refinish all finished surfaces damaged by this contractor to match adjacent surface.

D. Where new electrical work is installed in the existing building, patch and refinish surfaces damaged to match existing. Refinishing to be as directed by the Architect or Engineer.

3.04 Framing And Blocking

A. Structural framing will be done by the Contractor.

B. Blocking required for sole use of electrical work such as fastening and support of outlet boxes, fixtures, panels, conduit, etc., will be by the Electrical Contractor.

3.05 Protection

A. Cap or plug all raceway openings during construction.

B. Protect all completed work against dirt, water or chemical damage, mechanical accident or injury.

C. Equipment found damaged or in other than new condition will be rejected as defective.

3.06 Sleeves

A. Where conduit passes through masonry or concrete, install sleeves during construction of same.

B. Where conduit must by necessity pass through beams or columns, install sleeves located as directed by Engineer.

3.07 Identification

A. Label complete electrical system to indicated use of each item of equipment or load served.

B. Identification of Disconnecting Means: Provide identification of disconnects in accordance with Section 110-22 and Section 240-83 of the National Electrical Code.

C. Identification of Conductors and Components for Distribution Systems Operating at Two or More Different Voltages: Identify components in accordance with Section 210-4(d) of the National Electrical Code. Required labeling shall be by Micarta plate.

D. Provide black laminated white core engraved nameplates with lettering not less than 3/16 inch high attached to the outside of junction boxes larger than 4-11/16 inch; surface mounted cabinets, panelboards, time switches; disconnect switches, starters, contactor, relays; subdistribution and branch circuit panelboards, dry transformers and other items indicating equipment or load served. At flush mounted cabinets, panelboards, time switches and similar items mount nameplate on inside of door at finished areas and on outside of door at mechanical, storage rooms and other non-public spaces. Attach nameplates with epoxy glue.

E. Flush mounted devices with stainless steel or plastic finish plates requiring identification to be engraved with lettering not less than 1/8 inch high with black color filling.

F. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018 inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.

G. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.

H. At Main Distribution Panels provide black laminated white core engrave nameplates attached to panel exterior with epoxy glue. Size of nameplate and lettering as directed. Label distribution breakers, main breakers, sub-breakers and panel sections to identify all components and voltage and phase of system. In addition, provide master nameplate indicating project name, date, Architect (when applicable), Electrical Engineer, and Electrical Contractor. Lettering minimum of 1/4 inch high. Provide half-sized electrical one-line diagram (s) framed and mounted on wall near main distribution panel (s).

3.08 Installation

A. Wiring Requirements: Install wiring complete to every outlet with all devices shown and/or required. All wiring to be in raceways and concealed throughout finished areas unless specifically noted otherwise. For the purpose of electrical specifications, all areas, with the exception of boiler rooms, mechanical rooms and mechanical spaces, are to be considered as finished areas.

B. Provide raceway connections between outlets, outlets and panels and equipment and panels as shown on Drawings. Size raceways according to governing codes unless otherwise noted.

C. Locations:

1. Verify all locations with actual field conditions, and plans to avert possible installation conflicts.

2. Coordinate work with that of other trades to assure symmetrical placing of fixtures in respect to ceiling tile, grilles, etc.

3. Cabinets: Where electrical outlets occur in face, decks or base of cabinets or in walls above counters, carefully coordinate with details and arrangements of same.

4. Any work, which is incorrectly installed without prior verification with General Contractor, Architect, Engineer and Drawings, will be ordered removed and relocated and any damage to other work shall be repaired at no cost to the Owner.

5. In general, locate outlets as indicated in symbol schedule on Drawings.

D. All mounting heights shown on drawings are from finish floor to centerline unless otherwise shown. Mounting heights at non-typical locations shown with (+) sign and height required noted adjacent to outlet. Outlets located in concrete block, brick or tile walls are to be adjusted in height to coordinate with modular joints of the materials.

3.09 Painting

A. Painting in general will be covered under another Division of this specification, except items furnished under this Division that are scratched or marred in shipment or installation and/or require custom painting.

B. Install equipment with manufacturer's standard finish and color unless otherwise specified. Refinish any marred or oxidized items restored to manufacturer's factory finish.

C. Required surfaces or equipment with no standard finish; clean off grease and scale. Restore to smooth finish. Give one coat of primer, two coats finish.

D. Paint and color as selected by Architect or Engineer.

E. All exposed conduits on painted walls shall be painted to match wall and trim colors. Conduit labels shall be neatly affixed and shall not be painted over.

F. All electrical equipment and conduit exposed in finished areas and on exterior walls shall be painted to match surrounding surfaces.

G. Contractor shall coordinate the timing of painting requirements.

H. Refer to architectural specifications for methods and materials.

3.10 Future Provisions

A. Provide pull line in each empty conduit provided for future installation of wiring.

B. At all systems such as fire alarm, etc., where future stations are to be fed from adjacent outlets or terminal cabinets, all conductors required for complete installation of additional units are to be provided to nearest outlet or terminal cabinet as required. In general, all wiring installed so it will not be necessary to remove existing conductors and repull additional wiring to install additional units. All spare conductors properly labeled and terminated in outlet boxes or at terminals in terminal cabinets.

3.11 Noise Control

A. To minimize noise transmission between occupied spaces, outlet boxes at opposite sides of partitions are not to be placed back to back and installation of straight-through boxes is not permitted.

B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls, which are common to occupied spaces unless specifically called for on Plans. Where equipment is mounted on wall common to occupied spaces, provide shock mounting or noise isolators to effectively prevent transmission to occupied spaces.

C. Ballasts, contactors, starters and like equipment found noticeably noisier than similar equipment of same type are to be removed and replaced as directed by Engineer at no cost to Owner.

3.12 Fire-Stopping

A. Where raceways penetrate floors, ceilings, ducts, chases and fire walls, provide fire stopping to maintain integrity of the fire assembly. The code authority having jurisdiction shall approve fire-stopping method.

B. Where electrical boxes exceeding 16 square inches are located in fire resistive walls, fire stopping shall be provided to maintain integrity of the fire assembly.

3.13 Continuity Of Service

A. Keep outages to occupied areas to a minimum and prearrange all outages with Owner, Engineer and utilities involved. Requests for outages shall state the specific dates and hours and the maximum durations, with the outages kept to these specified times. When power interruptions will last longer than 5 minutes and cover more than 10% of the building, or affect public areas, they shall be performed on the weekend between 1 and 5 AM.

B. Contractor shall coordinate with Owner or Engineer so that work can be scheduled not to interrupt operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.

C. No circuits shall be turned off without prior approval from Owner or Engineer. Coordinate with the operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.

D. This contractor shall be liable for any damages resulting from unscheduled outages or for those not confined to the preapproved times. Include all costs for overtime labor as necessary to maintain electrical services in the initial bid proposal. Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance. Requests for outages must be submitted at least (5) days prior to intended shutdown time.

E. When applicable, include in bid cost of minimum temporary power to Fire Alarm System, Security, Telephone/Data equipment and any other equipment designated by Owner, during time when primary building power has been interrupted.

3.14 Demolition And Salvage At Existing Structures

A. Contractor shall make all necessary adjustments to the electrical system required to meet code, accommodate installation of the new work, and for demolition and removal at existing structures.

B. Remove all existing fixtures, controls, clocks, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless specifically shown as retained or relocated on the drawings. If existing walls, ceiling, floors, etc. are moved, extend existing devices, fixtures, and circuiting to the new location.

C. Disconnect all existing mechanical equipment scheduled for removal or relocation as described in specifications and shown on the Plans. Remove abandoned raceways and cables. Re-label panels and motor controls centers to reflect changes.

D. If existing junctions boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment that is being retained, new conduit and wire shall be provided to bypass the abandoned outlets. If existing conduits pass through partitions or ceilings which are being removed or remodeled, new conduit and wire shall be provided to route around the ceiling or wall and maintain service to the existing load.

E. Extend circuiting and devices in all existing walls to be furred out.

F. Locations of items shown on the drawings as existing are partially based on as-built and other drawings which may contain errors. The Contractor shall verify the correctness of the information shown prior to bidding and provide such labor and material as is necessary to accomplish the intent of the contract documents. The plans may shown some demolition conditions, but are not intended to shown all of them.

G. All materials accumulated during the demolition process are the Owners property and shall be removed from the job site as directed by the Owner.

3.15 Work At Existing Structure

A. Connect to and extend all existing electrical systems as required. Verify location of existing raceways stubbed out. If raceways indicated are not of proper size or in proper location, provide new as required for completion of project.

B. At areas where new ceilings are being installed, remove existing light fixtures and provide box extensions and reinstall existing fixtures. See Architectural Drawings for areas involved.

3.16 Safety

A. The Drawings and the specifications do not include design or construction details or instructions relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work.

B. The Contractor shall provide necessary shoring, railing, barricades, protective devices, safety instructions and procedures to perform the work safely and to comply with State Safety Requirements and OSHA requirements.

3.17 Cleanup

A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done at sufficient frequency to eliminate hazard to the public, other workmen, the building or the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, wiring devices, cover plates, light fixtures, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.

3.18 Asbestos Bearing Materials

A. If during the course of his work, the Contractor observes the existence of asbestos or asbestos bearing materials, the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Architect, determine a further course of action.

3.19 Polychlorinated Biphenyls (PCB's)

A. If during the course of his work, the Contractor observes the existence of polychlorinated biphenyls (PCB's), the Contractor shall immediately terminate further work on the project and notify the Owner of the condition. The Owner will, after consultation with the Architect, determine a further course of action.

3.20 Payment for Work.

A. Payment for work under this Division shall be covered and included as part of the Basic Bid on the project, or as outlined under any schedules.

END OF SECTION

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SECTION 26 0510
RACEWAYS, BOXES & CONDUCTORS

PART 1 - GENERAL

1.01 Description

A. Provide conductors, cables, connectors, lugs, cable ties and terminations for all systems.

B. Provide all raceways, fittings, outlet boxes, junction boxes, pull boxes and special boxes required for complete project. Install all systems in raceways unless specifically noted otherwise.

C. Not all conduits are shown. Where not specifically indicated, Contractor shall be responsible for sizing conduit per applicable codes for number of conductors.

D. Provide all seismic bracing (as required for the applicable seismic zone as determined by the Geotechnical Engineer or Architect) of equipment, feeders and other electrical items in accordance with prevailing codes. Produce and submit the required designs, calculations, certifications and stamped drawings to the authority having jurisdiction and obtain their approval prior to installation or fabrication. Comply with latest edition of the SMACNA Seismic Restraint Manual.

E. Related work in other sections includes.

1. Providing conductors, Section 26 0519, Conductors and Cables.

2. Providing boxes, Section 26 2726, Wiring Devices and Floor Boxes.

3. Providing supporting devices, Section 26 0529, Hangers and Supports.

1.02 Quality Assurance

A. UL listed.

1.03 Product Delivery, Storage And Handling

A. Deliver raceways with UL label and bearing manufacturer's name on each length.

B. Store and handle raceways and boxes so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.

C. Cap raceway ends until used.

D. Deliver fittings in manufacturer's original unopened and undamaged packages with labels legible and intact.

PART 2 - PRODUCTS

2.01 Conductors

A. Secondary service entrance conductors: Copper 600 volt type "THW", "THHN", or “XHHN” stranded, unless otherwise noted. Sizes as shown on Drawings.

B. Feeder conductors:

1. Copper, 600 volt, type “THW”, “THHN” or “XHHW” unless otherwise noted, sizes as shown on drawings.

2. Aluminum conductors are acceptable as panelboard feeders as shown on drawings for copper sizes #2/0 AWG and above only.

3. Drawings are based on copper conductors, contractor to provide a list of conductor and conduit sizes to the Engineer for review for all aluminum conductors to be used. List to be provided prior to ordering material.

C. Branch circuit conductors:

1. Copper, minimum size No. 12 AWG. Conductors No. 12 and No. 10 AWG shall be soft drawn, solid copper. Conductors larger than No. 10 AWG to be stranded, soft-drawn copper. Use type "THW", “THWN”, or "THHN". Special conductor types where noted or required by code.

D. Low-Voltage: Provide low-voltage conductors as per individual manufacturer’s recommendations.

2.02 Metal Clad Cable:

A. Cable shall be steel or aluminum jacketed interlocking armor with internal fully insulated green grounding conductor. Cable shall contain multi-conductor thermoplastic insulated type THHN color-coded solid or stranded copper conductors and shall be UL approved for the intended application.

B. Connections, terminations and fasteners shall be UL approved for the application, and designed specifically for use with the cable used, and shall have insulated throats to protect the wire.

C. Approved Manufacturers: MC Cable: AFC/A Nortek Company, Type Mc-Lite, HC-90; Alflex, Armorlite.

D. Tools: Use only tools approved by cable manufacturer. Cutting tool should be controlled depth rotary cutter.

E. See Installation for specific restrictions on use of MC Cable.

2.03 Rigid galvanized steel and IMC conduit:

A. Rigid galvanized conduit: Rigid steel zinc coated, manufactured in accordance with UL-6, ANSI, and Federal Specifications WW-C-540 standards.

B. Intermediate Metal Conduit (IMC): Zinc coated galvanized steel to comply with UL-1242, Type J and ANSI Standards.

C. Application:

1. Employed for runs embedded in concrete, concrete block, underground, wet or damp locations, where subject to mechanical injury, and where exposed within eight feet of floor.

2. Make threads watertight with bituminous sealer (solvent type cut back) before assembly where installed underground, in moist locations or where exposed to weather.

D. Fittings: Threaded iron or steel only, Thomas & Betts or O-Z/Gedney in sizes up to 1-1/2 inch plastic insulating type O-Z/Gedney type "A", or "T&B" 220 Series; sizes above 1-1/2 inch insulated metallic bussings O-Z/Gedney type "B" and "T&B" 1220 Series.

2.04 Rigid Stainless Steel conduit: Solid stainless steel.

A. Application: Required in most outdoor marine or corrosive environments or as specified.

B. Fittings: Threaded stainless steel. Erickson couplings, watertight split couplings (OZ or equivalent) permitted so long as all components are of the same stainless steel alloy and are waterproof.

2.05 Electrical metallic tubing (EMT): Steel zinc coated, to comply with ULI-797 and ANSI Standards.

A. Application:

1. Dry locations only. May be used in framed construction, furred ceilings and above suspended ceilings.

2. May be exposed in unfinished areas where not subject to damage.

B. Fittings: Connectors and couplings to be case steel. Preinsulated connectors and couplings up to one (1) inch trade size may be compression, indenter or setscrew type. Fittings above one (1) inch trade size shall be compression type. All connectors shall have insulated throats. Thomas & Betts, Steel City or approved.

2.06 Liquidtight flexible metal conduit: Zinc steel core with smooth gray abrasion resistant, liquidtight, polyvinyl chloride cover (with integral ground wire wound in steel core), to comply with UL 360 and ANSI Standards. Anaconda Sealtite type U.A. Electro Flex L4, Alflex Ultratite UL or EF or approved.

A. Application: For connection to equipment. Minimum size 3/4-inch for motor connections. Use 3/8-inch only for fixture and control wiring. Provide sufficient length of flexible conduit to avoid transmission of vibration.

B. Fittings: “Thomas & Betts" Supertite or approved.

2.07 Flexible metal conduit, to comply with UL360, ANSI Standards, and Federal Specification WW-6-566.

A. Application:

1. Permitted only in dry locations where flexibility is required in length not over 18 inches.

2. Minimum size required 1/2 inch, unless noted otherwise.

3. Where flexibility is not required, flexible metal conduit is not to be used without written permission of the Architect or Engineer.

B. Fittings: Screw-in-type factory preinsulated "Thomas & Betts".

2.08 Non-metallic conduit: Polyvinyl chloride schedule 40 heavy wall UL listed for underground and exposed applications in accordance with National Electrical Code to comply with NEMA TC2. Carlon Electrical Products, PWC or approved.

A. Application:

1. Permitted for runs embedded in concrete or underground in wet or damp locations.

2. All conduit offsets and bends made with factory fittings.

3. All 90 degree ells and conduit entrances into buildings to be with rigid galvanized or fiberglass conduit.

4. PVC conduit installed under roadways or areas subject to heavy traffic shall be provided with a minimum of 36" cover.

5. Fiberglass or galvanized rigid elbows shall be used for angles larger than 30 degrees where the conduit size is greater than one inch.

6. Provide a ground wire sized per code in all PVC conduits. Conductor quantities indicated in conduits do not include ground wires unless otherwise noted.

2.09 Wireways: All steel with screw covers. Parts coated with rust inhibitor and finished in color to match adjacent distribution equipment. Where located separate from distribution and control equipment, finish standard industrial gray enamel.

2.10 Surface raceways:

A. Allowed only upon prior approval by Architect or Engineer.

B. Surface mounted "Raceway” type, size and with number, spacing and type of outlets shown on Drawings. Provide raceways with all connectors, end fittings and miscellaneous items required for complete installation. Finish standard gray or beige as selected. Wiremold Co., Mono System or approved.

C. Install parallel to building surfaces.

2.11 Seals and Fittings:

A. Conduit plugs: Ideal "Conduloc" sizes 1/2 inch through one inch and T&B, Push Penny Plugs Series 1470 for 1-1/4 inch and larger, or approved for sealing conduits during construction. Steel City PL-200 series screwdriver slot threaded meter plugs or Killark Cat. No. CUP-O through CUP-9 for permanent plugs.

B. Floor and wall entrance fittings: O-Z/Gedney Electrical Mfg. Co. Type "FSK" entrance seal.

C. Expansion fittings: O-Z/Gedney Electrical Mfg. Co. Type ‘E’ expansion coupling with bonding jumper for up to four inch of movement.

D. Conduit seals: Vertical or horizontal type Crouse Hinds type "EYS" or approved.

E. Lead Roof Flashing Assembly: Open top caulk, six inch diameter skirt, Stoneman Engineering & Manufacturing Company No. S1000-4 for 1/2 inch diameter through eight inch diameter. Caulking compound G.E. Silicon Construction Sealant SCS-1200 or Dow Corning 781. Refer to Architectural.

F. Wall and floor fire and smoke barriers: Concrete floor type O-Z/Gedney Gedney Co. "Fire Seals" or approved. UL labeled fire barrier material installed in accordance with manufacturer's recommendations. 3M Branch Fire Barrier System; Chase Technology Corp. No. CTC PR-855; Fire Stopping Products SpecSeal, Putty, Sealant, Collars, and Mortar; or approved.

2.12 Pull lines: Polyline as manufactured by "Greenlee" or approved.

2.13 Underground Marking Tape:

A. Power: 6” wide, yellow, low density polyethylene, 4-mil thickness. Imprinted with “CAUTION – STOP DIGGING – BURIED ELECTRIC LINE BELOW” and current date. Somerset “Protect-A-Line” or approved.

B. Telephone/Data: Similar to Power tape except green.

2.14 Boxes

A. Outlet boxes: Steel City, National, or approved, steel boxes as best suited for purpose intended and as follows:

1. Lighting outlets: Four-inch octagon with 3/8-inch fixture studs.

2. Switch and receptacle outlets: Four inch square with proper device cover.

3. Telephone/Data: Four inch square by minimum 2-1/8 inch deep. See Telephone/Data specification for additional requirements.

4. Gang boxes: One piece pressed steel minimum 1-1/2 inch deep by four inches high by length required with proper device covers.

5. Masonry outlets: Standard boxes as specified above with square cornered tile wall covers with raise of depth required for specific conditions encountered. Steel City 52-C-49 and 72-C-49 series or approved.

6. Utility boxes: Allowed only with special permission of Engineer.

7. Special outlet boxes: See other section of specification for special outlet boxes.

B. Device covers for outlet boxes: Raised pattern, 3/4 inch minimum raise at plaster work, all other covers with raise equal to total wall material thickness. Surface boxes with 1/2 inch raise and rounded edges. Steel City, Raco or approved.

C. Extension rings: 1-1/2 deep. Steel City, Raco or approved.

D. Pullboxes

1. Pullboxes: Galvanized steel (indoors) or cast metal (exterior or damp locations) construction, conforming to National Electrical Code, with screw-on cover.

2. Flush Mounted Pullboxes: Provide overlapping covers with flush-head retaining screws, finished in light grey enamel.

3. Box volumes shall meet NEC for size and number of entering conduits.

4. In-Ground Pullboxes: In-ground pullboxes shall be suitable for specific application and as required by respective utility provider. See plans for typical types and locations.

E. Junction boxes: Minimum four inch square by 1-1/2 inch deep. In finished areas provide with two gang device cover and matching blank finish plate.

F. Floor boxes: See Section 16140 – Wiring Devices and Floor Boxes.

G. Weatherproof Outlet Boxes:

1. Provide corrosion-resistant cast metal weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal face plate with spring-hinged waterproof cap suitably configured for each application, including face plate gasket and corrosion proof fasteners.

2. Weatherproof boxes to be constructed to have smooth sides, gray finish.

3. Boxes used in contact with soil shall be cast iron alloy with gasketed screw cover and water-tight hubs.

4. Weatherproof Plates: Cast metal, gasketed, for switches and receptacles provide spring-loaded doors.

H. Weatherproof Junction and Pullboxes:

1. Provide galvanized sheet steel junction and pullboxes, with screw-on covers; of the type, shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

I. Knockout Closures: Provide three (3) piece punched-steel knockout closures.

2.15 Fasteners

A. Provide approved fasteners for each specific application. Hammer-driven and trigger-fired anchors may be used only after obtaining specific written authorization from Architect.

1. Wood: Wood screws or screw-type nails.

2. Hollow masonry block: Toggle bolt.

3. Concrete or Brick: Expansion bolts. For new concrete work use cast-in-place inserts.

4. Steel: Machine screws, welded threaded studs, heat-treated or spring steel tension clamps.

2.16 Outlet box supports:

A. Wood stud walls: Adjustable bar hangers with "C" channel cross section Steel City 6010 series, or approved, or mounted on solid blocking. Four inch square boxes adjacent to wood studs may be side nailed and back braced with Steel City No. 50 box brace.

B. Metal studs: Caddy Bar Hanger Assembly BHA or Caddy MSG or MSF metal stud clips.

C. Concrete or masonry walls where boxes are not cast in place: Flush anchors, power actuated anchors, hammer driven trigger fired anchors, or concrete inserts.

D. Flush ceiling outlets: Steel City 6010 series or equal bar hangers.

2.17 Conduit supports:

A. One hole malleable straps, Steel City, Appleton, T&B, Diamond, Raco, or approved.

B. Conduit clips: Caddy, Raco or approved.

C. Nail-up straps: 1/2 inch thru one inch Raco 2252, 2253, 2254, or approved.

D. Adjustable hangers 1-1/2 inch conduits and larger: Steel City C-149 with threaded steel rod of proper size.

E. Adjustable trapeze hangers to support groups of parallel conduits: Steel City B-905 steel channel, H-119 square washer, C-105 strap threaded rod. Components of Unistrut, Globe Strut, Harvey Alstrut, or approved.

F. Drive ring spacing supports for open wiring, Diamond 800 series, or approved. Size as required by number of conductors installed.

2.18 Hanger rod attachments: Side Beam Connector, Kindorf E-244; 90 degree fitting, Kindorf B-916; clamp type anchor clips Kindorf Type "C", Unistrut P2675 or approved; spot type concrete insert Kindorf B-255 with "Galv-Krom" finish.

2.19 Support channels: Kindorf B-905 with Galv-Krom finish, and C-105 single bolt channel pipe straps.

PART 3 - EXECUTION

3.01 Conductors

A. Circuiting. Install branch circuiting exactly as shown. Conduit may be routed at Contractor's best judgment unless directed otherwise. Home runs are diagrammatic for clarity, and may be grouped as desired. Size conduits accordingly with capacity for 25% future fill.

B. Feeder conductors: Wires shall be factory color-coded by integral pigmentation. Colored plastic tape permitted on No. 6 and larger where integral pigmentation impractical. Apply tape in spiral half-lap over exposed portions in manholes, boxes, panels, switchboards and other enclosures.

C. All circuit conductors shall be identified with circuit number at all terminals, intermediate outlets, disconnect switches, circuit breakers, motor control centers, etc. Both ends of a given conductor shall be identified alike.

D. Install wire in conduit runs after concrete and masonry work is complete and after moisture is swabbed from conduits. Leave six-inch single wire pigtails for connection of fixture leads and devices to branch circuits.

E. Neatly bundle and tie with cable ties conductors in panel gutters, wire gutters, motor control centers, dimmers, etc. where multiple conductors run in accessible wireways. Spacing as required to neatly group and support conductors.

F. Quantity of conductors shown in any one raceway is not to be increased without specific permission of Engineer.

G. Install control conductors in separate raceways unless otherwise noted.

H. Alarm and Detection System: Color code conductors as directed by equipment manufacturer. Where sufficient number of colors are not available to provide separate color for each item, provide W.H. Brady wire markers (or approved equal) on conductors marked similarly at all terminals and connections.

I. Raceway for low voltage NEC Class II wiring will be required only in walls, air plenums, inaccessible ceiling, and areas where conductors might be exposed to physical damage. Cables approved for use in air plenums and non-combustible ceilings will be accepted in lieu of conduits in plenums or non-combustible ceilings. Cables installed in cable tray shall be approved for such use. All low voltage cable must be suitable for the conditions in which it will be used. Prior to purchasing or installing any cable, confirm with the Mechanical Contractor which areas, if any, require plenum rated cable.

3.02 Raceways

A. General Installation:

1. In general, install raceways concealed in construction except where shown otherwise on the Drawings or unless specifically approved by Architect or Engineer.

2. Unless otherwise noted, size raceways in accordance with Table in Appendix C of NEC for type "THW" conductors regardless of type of conductor specified.

3. Two or more conduits using the same routing: Mount on channel support system. Unistrut or approved.

4. Provide pull line and cap off watertight each empty conduit provided for future installation of wiring.

5. Conduit stubbed from a concrete slab or wall to serve an outlet under a table or to supply a machine shall have a rigid conduit coupling flush with the surface of the slab. Provide plug where conduit is to be used in future.

6. Allow minimum of 6 inches clearance at flues, steam pipes, and heat sources. Do not run conduits beneath boilers or heating units.

7. Dissimilar Metals: Avoid contact with pipe runs of other systems.

B. Lengths and Bends:

1. Maximum number of bends in any run shall be the equivalent of three (3) 90 degree bends (270 degrees total). Maximum length of any run shall be 100 feet, except as allowed in underground installations.

2. Junction and pull boxes shall be provided to maintain these limits. Do not locate pull boxes or junction boxes in finished areas unless specifically shown or special permission is obtained from Architect or Engineer.

C. Exposed raceways:

1. In finished areas run parallel with or at right angles to building structural lines and closely follow surfaces wired over. Conduits offset at panels, outlets, junction boxes, etc. Conduit 1-1/2 inch and larger suspended at locations as directed by Architect or Engineer.

2. In accessible void and furred spaces, conduit may be run in a direct line between outlets with long sweep bends and offsets closely following surfaces wired over. Suspend conduit 1-1/4 inch and larger to be run to allow maximum access to space and located as directed by Architect or Engineer.

3. For exposed runs, attach surface mounted conduit with clamps. Where conduit runs along the inside of exterior walls, mount to channel-type strut at required spacing.

D. Concealed raceways:

1. At inaccessible areas, raceways may be run in a direct line with long sweep bends and offsets. In cavity walls, run conduit in hollow spaces and do not chase interior or exterior masonry.

2. At accessible areas above lift-out or accessible ceiling areas, run conduit on top or bottom of lower cords or trusses or on underside of roof. Vertical extensions for wiring to ceiling outlets and fixtures kept to minimum length.

E. Raceways in Concrete Slabs:

1. Do NOT install conduit larger than one inch maximum in concrete slabs unless specifically shown or approved.

2. Conduits in above grade slabs shall be located in the middle of the slab. Conduit installed in any concrete slab shall have a minimum two (2) inch cover. The maximum size, spacing, and location of conduits in post-tensioned slabs shall be subject to approval by the structural engineer. Conduits larger than one inch shall not be run in slabs.

3. Space no less than 8” on center and as far apart as possible where converging at panelboard locations.

4. Do not interfere with placement of re-bar. Place raceway under rebar layer. Spacing not less than eight (8) inches on center, or as required and as wide as possible where converging at panels, etc. Adequately secure raceway, boxes, inserts, etc. by mechanical means or suitable adhesive prior to pour.

5. Cap and securely support conduits prior to concrete pour.

6. Stub-Ups:

a. Install rigid galvanized conduit, Schedule 80 PVC or Fiberglass conduit with threaded coupling set flush with finished floor. Seal with flush, threaded pipe plug.

b. Where stub-up extends above floor, install conduit at such depth that no curved section of the elbow is exposed.

F. Expansion Joints:

1. All conduits crossing expansion joints where cast in concrete shall be provided with expansion-deflection fittings, equivalent to OZ/Gedney AXDX, installed per manufacturers recommendations.

2. All conduits three inches and larger where not cast in concrete shall be rigidly secured to the building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across the joint, equivalent to OZ/Gedney AXDX, installed per manufacturer's recommendations.

3. All conduits less than three inches where not cast in concrete shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits three inch and larger, may be installed.

G. Seismic Joints:

1. No conduits cast in concrete shall be allowed to cross a seismic joint.

2. All conduits shall be provided with junction boxes securely fastened on both sides of the expansion joint, connected together with 15 inches of slack (a minimum of 15 inches longer than the straight line length) flexible conduit with copper green ground bonding jumper. Prior to installation, verify with Architect that the 15 inches is adequate for the designed movement, and if not, increase this length as required.

H. Underground raceways:

1. Use galvanized rigid steel, fiberglass or Schedule 40 (or 80) PVC with galvanized rigid steel or fiberglass elbows and risers.

2. Maximum length of any run shall be 300 feet, less 50 feet for each equivalent 90-degree bend.

3. Install underground marking tape buried 6-8 inches below grade, directly above conduit.

4. Run in a direct line with long sweep bends.

5. Raceways inside of building run below slab in gravel fill.

6. Burial Depth – Secondary Service:

   a. Rigid Galvanized: Minimum 24-inches below finish grade, unless noted otherwise.

   b. PVC: Where installed under roadways or areas subject to heavy traffic provide a minimum of 36-inches of cover. All other locations, minimum 30-inches below finish grade, unless noted otherwise.

7. Burial Depth – Primary Service: Minimum 48-inches below finish grade or as required by serving utility.

8. All underground raceways to be made water-tight with sealed threads or couplings.

9. Rigid Galvanized conduit shall be coated entire length with coal-tar material (Koppers Bitumastic 515) or with PVC jacket (15 mil. Minimum).

I. Penetrations, Seals & Plugs

1. All 90 degree ells and conduit entrances into buildings to be with rigid galvanized conduit. Coat with coal-tar material (Koppers Bitumastic 515)

2. Provide conduit seals at exits and entrances from hazardous locations (i.e. Chlorine storage or distribution rooms), freezer rooms and other locations as required by NEC Article 500.

3. Conduit penetrations of the electrical room walls and floor must “float” via backer rod or fiberglass and caulked air tights.

4. Provide conduit plugs at all raceway openings during roughing-in to prevent entrance of foreign matter.

5. Provide floor or wall entrance fittings at all points where raceways enter or exit below finish grade at tunnels, basements or trenches.

6. Any conduit leaving the building envelope (e.g., site lighting, roof mounted HVAC equipment, etc.) to be 3/4-inch minimum and must slope downward. Seal conduits at interior side of building. Pack non-hardening duct sealing mastic around wires in the raceway.

7. Provide wall or floor fire and smoke barriers to cut off all concealed draft openings (both vertical and horizontal) where raceways perforate fire walls.

8. Roof Penetrations:

   a. Provide roof-flashing assembly at locations where conduit pierces the roof.

   b. Locate conduit minimum six inches from roof curbs or flashing.

   c. Provide caulking compound between counter flashing and conduit for watertight seal.

J. Multi-outlet surface raceways:

1. In general, raceways to extend full length of wall or cabinet at locations indicated.

2. See Architectural elevations and Electrical Drawings for locations and installation requirements.

3.03 Metal Clad Cable:

A. Permitted metal Clad Cable Uses:

1. Metal Clad cable shall only be used for concealed branch circuit interior wiring and may be exposed only in unfinished crawl spaces or attics. It shall not be used in inaccessible ceiling areas.

2. Metal Clad cable shall not be used for branch circuit home runs. Home runs shall be installed using conduit and conductor method from the circuit breaker panel to a junction box in the nearest accessible ceiling to the point of usage. From the junction box, Metal Clad cable may be used to each device or light. Metal Clad cable shall not be allowed from device to device.

B. Support horizontal and vertical cable six feet on center (maximum) and within six inches of boxes with approved cable clamps. Cables shall not rest on accessible ceiling tiles. Attach cables with metal clips or plastic cable ties to support wires from structure. Cable shall not be supported from, or come in contact with, mechanical ducts, water, sprinkler or gas piping; maintain six inch separation minimum.

C. Cable shall be cut with manufacturer-approved devices.

D. Junction Boxes: Splice conductors only in accessible junction boxes. Provide junction box at all cable penetrations of wall, ceiling or floor surfaces for equipment connections; cable shall not be run directly through finished surfaces. Provide junction box at transition from concealed to exposed wiring. Provide junction box at transition from interior to exterior wiring.

E. Voltage Drop: Conductors over 75 feet for 120 volt, for branch or individual circuit home runs from equipment connection, receptacle or lighting fixture shall be No. 10 AWG minimum.

F. Where cable penetrates fire-rated walls or floors, provide mechanical fire stop fitting with UL listed fire rating equal to wall or floor rating.

3.04 Boxes

A. Verify location of all outlet boxes with actual field conditions and plans to avert possible installation conflicts. Architect or Engineer reserves the right to make minor changes prior to installation without cost to the Owner. Coordinate work with that of other trades.

B. Toe Spaces: Boxes for receptacle outlets in toe spaces to be mounted horizontally.

C. Above Counter: Boxes for devices above counter should be typically mounted vertically, however, due to unforeseen field modification in casework and backsplashes, please coordinate with the architect.

D. Extension rings: Do not add more than one to any box with maximum depth of box and extension ring not to exceed three inch unless specifically indicated otherwise.

E. Boxes and pendants for surface-mounted fixtures on suspended ceilings shall be supported independently of the ceiling supports.

F. In open overhead spaces, cast metal boxes threaded to raceways need not be separately supported except where used for fixture support. Cast metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers.

G. Where bar hangers are used, the bar shall be attached to raceways on opposite sides of the box and the raceway shall be supported with an approved fastener not more than 24 inches from the box.

3.05 Hangers and Support

A. Provide independent support to building structural members for all electrical fixtures, materials, or equipment installed in or on ceilings, walls, void spaces, and over furred or suspended ceilings. Supports shall be designed for a minimum of four times the weight of equipment including hangers.

B. Other crafts' fastening devices shall not be used for the supporting means of electrical equipment, materials or fixtures. Supports and/or fasteners shall not be used to support more than one particular item.

C. Vertical support members for equipment and fixtures shall be straight and parallel to building walls.

D. Hammer driven trigger fired and power actuated anchors may not be used in the following locations at concrete construction: In slabs or walls less than four inch thick; in joist or beams, including concrete waffle slabs which are less than eight inch wide; within three inches of any edge or opening; in prestressed concrete without prior approval of the Engineer unless specifically indicated otherwise.

E. Exact location and spacing between supports per manufacturer's recommendations and NEC requirements as minimum.

F. Fiber anchors, lag shields, perforated tape or wire not permitted unless otherwise indicated.

G. Raceways

1. Support conduits within 18 inches of outlets, boxes, panels, cabinets, couplings, elbows, and deflections. The maximum distance between supports shall not exceed ten foot spacing.

2. Conduit up to and including 1-inch EMT may be supported from ceiling fixture wires by conduit clips or other approved devices only with written approval of the installer of the ceiling support system. All other conduit runs shall be secured to the structure by two-hole straps or supported on Kindorf or Unistrut hangers. Wire will not be permitted for supporting conduit. All visible conduit runs will be parallel to the building structural lines.

3. Anchor conduit install in poured concrete to the steel reinforcing with No. 14 black iron wire.

4. In partitions of light steel construction, sheet metal screws may be used, and bar hangers may be attached with saddle-suspended ceiling construction only. Lighting system branch circuit raceways shall be fastened to the ceiling supports.

5. Support suspended feeder conduits by metal ring or trapeze hangers with threaded steel rods. Wire ties to prevent displacement, using not less than No. 14 iron wire, may be used only for concealed runs in concrete for conduit up to 1 ¼ inch.

6. Support all conduit within 18 inches of each box, coupling, elbow and panel at spacing of not more than ten feet along runs.

7. At Main Distribution, Subdistribution and surface mounted branch panels and cabinets where conduit exit from the top, provide support channels on wall 24-inch above panel and at six feet intervals from thereon for support of conduits.

8. Layout to maintain headroom, neat mechanical appearance, and to support equipment loads required.

9. Conduit shall be installed in such a manner as to prevent the collection of trapped condensation. All runs of conduit shall be arranged to avoid of traps wherever possible.

3.06 Cleaning

A. Complete raceways system before pulling-in conductors.

B. Remove all foreign matter from raceways and blow out or vacuum smaller conduits and pull mandrel through larger conduits prior to installing conductors.

3.07 Painting

A. All exposed conduits on painted walls to be painted to match wall and trim colors.

END OF SECTION

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SECTION 26 0526
GROUNDING AND BONDING

PART 1 - GENERAL

1.01 Summary

A. Provide a complete grounding system for all electrical equipment in accordance with NEC Article 250 and established safety practices.

B. Provide grounding grid at pad-mounted transformers.

C. Provide a main grounding electrode consisting of a bare No. 4 copper grounding electrode conductor connected to a concrete-encased electrode. Concrete-encased electrode provided by others. See detail on Architectural Drawings.

D. Provide a complete grounding electrode system. All building electrodes must be tied into this system per 250.50 of the NEC. These building electrodes are: the main concrete-encased electrode, any metal underground water pipe that is in direct earth contact for at least ten feet, and the metal frame of the building where effectively grounded.

E. The grounding electrode system is to include, but is not limited to: grounding conductors, fitting connectors and all other devices and material as required rendering the system complete.

1.02 Related Work In Other Sections

A. Providing conductors, Section 26 0523, Conductors and Cables.

B. Providing raceways, Section 26 0533, Raceways and Boxes.

1.03 Quality Assurance

A. UL listed.

PART 2 - PRODUCTS

2.01 Materials

A. Ground connectors: Bronze clamp type. All clamp accessories such as bolts, nuts and washers shall also be bronze to assure a permanent corrosion resistant assembly. Bolts used to fasten lugs to enclosures must be case hardened and sized for lug hole and hole drilled into enclosure. O-Z Gedney, Burndy, Ilsco or approved.

B. Ground rod clamps: Exothermic welding type or one piece cast bronze with safety set screw. Cadweld "G" series, Copperweld 6500 series, or approved.

C. Ground rods: Copper or steel core copper covered, minimum 5/8 inch by 10'-0". Copperweld 9400 series, or approved.

D. All ground cable splices and joints to be made with an exothermic welding process that shall provide a weld with current-carrying capacity not less than that of the conductors welded. Soldered connections not to be used.

PART 3 - EXECUTION

3.01 Installation

A. Install in accordance with NEC Article 250.

B. Except where specifically indicated otherwise, all exposed non-current carrying metallic parts of electrical equipment to be bonded together to limit any difference of potential voltage. Metallic raceway systems may be considered the equipment grounding system where specifically noted or where approved in the NEC. Equipment grounding conductors must be installed in all non-metallic conduit systems. All load side equipment to have the neutral system isolated from the equipment grounding system. The equipment grounding system must provide a low impedance path from the equipment back to the source equipment-grounding bar. This equipment-grounding bar to be connected to the system

neutral at the source by a main bonding jumper sized per NEC 250.28. 250.102, and 250.168. The equipment grounding conductors to be sized at least as large as required by NEC 250.122.

C. The grounding electrode system to connect to the service neutral, if required, or to the system grounded conductor if a neutral is not required. The electrode system may terminate on the equipment-grounding bar at the main service where a properly sized main bonding jumper has been installed. Water system bonding must utilize the proper size water pipe bond clamp to match the size of the water pipe.

D. Electrical Equipment Grounding (Safety Ground):

1. Ground non-current carrying metal parts of electrical equipment enclosures, frames, manholes, conductor raceways or cable trays to provide a low impedance path for line-to ground fault current and to bond all non-current carrying metal parts together.

2. Equipment grounding conductor to be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per NEC 250.122 unless larger conductors are shown on drawings.

3. Grounding conductors to be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation to be used and suitably identified with green tape at each junction box or device.

4. Install metal raceway couplings, fittings and terminations secure and tight to ensure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure, at concentric knock-outs, or at concentric or eccentric knockouts for circuits of over 250v to ground.

5. Lighting fixtures to be securely connected to equipment grounding conductors. Outdoor lighting standards to have a factory installed ground lug for terminating the ground wire.

6. Motors to be connected to equipment grounding conductors with a conduit ground bushing and with a bolted solderless lug connection on the metal frame. A separate equipment-grounding conductor to be run with each motor branch circuit.

7. Bonding to be provided to assure electrical continuity and the capacity to conduct safely any fault current likely to be imposed.

8. All plug-in receptacles to be bonded to the boxes, raceways and grounding conductor.

9. Equipment grounding conductors to be provided for all lengths of flexible metallic conduit. All equipment provided with two conductor cords to be rewired to provide a three-conductor type "S" cord and grounding attachment plug caps.

E. Neutrals throughout the system to be solidly grounded to one point at the system source.

F. Lighting and power panelboard to be grounded by connecting a conductor to the grounding stud and to the incoming and outgoing feeder conduits grounding bushings. Each grounding-type bushing to have the maximum ground wire accommodation available in standard manufacturer for the particular conduit size. Connection to the bushing to be with wire of this maximum size.

G. The grounding stud of each secondary voltage dry type, three phase transformer to be connected separately to the grounding lug on the panelboard serving the transformer. Connection to be by means of an insulated conductor run in conduit, sized as shown on the drawings.

H. Provide a No. 6 green coded insulated conductor from each telephone terminal board to the closest effectively grounded water pipe or structural steel.

I. When included as part of the project, the central equipment for the fire detection and alarm system is to have its grounding terminal connected to the ground lug on the panelboard serving the system by means of a No. 6 green coded insulated conductor, run in 3/4 inch metal conduit, utilizing a ground clamp.

3.02 Testing

A. Grounding Electrode Conductor (GEC):

1. Measure resistance between service equipment ground bus and each grounding electrode, using a Megger and a single length of additional wire, if necessary. Measure resistance between both ends of the additional wire used. Isolate and correct any poor connections as indicated.

B. System Ground Continuity:

1. At panels and selected outlets, measure the ground loop resistance between the neutral conductor and raceway using a megger or equivalent. Or, at selected outlets, measure the ground loop impedance using a ground loop impedance tester.

2. Ground loop impedance shall not exceed a value in ohms that is the voltage to ground divided by five (5) times the rated current.

3. Isolate and correct the cause of the poor connection. If the source of the high reading cannot be practically corrected, pull a separate ground conductor into the raceway and re-test.

4. Report findings to Engineer.

END OF SECTION

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SECTION 26 2400
SWITCHBOARDS AND PANELBOARDS

PART 1 GENERAL

1.01 Description

A. This Section shall include furnishing and installing switchboards, sub-distribution, and branch circuit panelboards with components as indicated. Incorporate switching and protective devices of the number, ratings and type shown and noted herein.

B. All panelboards and breakers to be fully-rated, Series rated panel boards and breakers are not acceptable.

1.02 Related work in other sections includes:

A. Providing concrete housekeeping pad for floor-mounted equipment under Division 03.

B. Providing identification, Section 26 500, Basic Electrical Materials and Methods.

C. Providing cable ties and lugs, Section 26 0519, Conductors and Cables.

D. Providing grounding, Section 26 0526, Grounding and Bonding.

1.03 Quality Assurance

A. American National Standards Institute (ANSI).

1. 67 Panelboards (ANSI/UL 67).

2. ANSI Z55.12 gray finishes for industrial apparatus and equipment.

B. Institute of Electrical and Electronics Engineers (IEEE).

1. Std. 241-74 Electric Systems for Commercial Buildings.

C. National Fire Protection Agency (NFPA).

1. NFPA 70 National Electrical Code.

D. Underwriters' Laboratory (UL).

1. UL 50: Cabinets and Boxes.

2. UL 67 Panelboards.

3. UL 869: Service Disconnects.

E. National Electrical Manufacturers Association (NEMA)

1. NEMA AB-1: Molded Case Circuit Breakers.

2. NEMA KS-1: Enclosed Switches.

3. Standards for Panelboards.

F. Federal Specification W-C-375B/GEN for Switchboards.

1.04 Submittals

A. Shop Drawings

1. Submit complete shop drawings with dimensions, components and internal connections in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

B. Switchgear: Submit shop drawings showing following:

1. Bus ratings and arrangement.

2. Frame size, trip setting, and interrupting rating of overcurrent devices.

3. Manufacturer's recommended settings of time delays and ground fault sensing adjustments of adjustable circuit breakers which demonstrate selective coordination.

4. Fault bracing rating of total assembly.

5. Elementary wiring diagrams for metering and relay protection.

6. Scale ranges of meters.

7. Dimensioned elevation and plan views.

8. Indicate top and bottom conduit entrance areas and dimensions.

9. Estimated short circuit minimum 22,000 AIC unless noted otherwise in drawings.

C. Submit operation and maintenance data in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

1.05 Product Delivery, Storage And Handling

A. Deliver with UL label and bearing manufacturer's name. Provide all equipment and each section with appropriate UL labels located in conspicuous places. Provide readily accessible nameplates.

B. Provide starters in manufacturers original cartons with labels intact.

C. Panelboard exterior trim separately packed to prevent damage during delivery and storage on site.

D. Upon receipt-open shipping carton and inspect for physical damage. Open switchgear and check interior condition. Prepare a written report of any damaged or unacceptable conditions.

E. Store and handle panelboards so as not to subject panels to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation. Keep switchboards wrapped or otherwise protected with plastic and stored on wood pallet on floor.

PART 2 PRODUCTS

2.01 Branch Circuit Panelboards:

A. Type:

1. NQOB for 120/240-volt panelboards with bolted breakers having minimum interrupting capacity of 22,000 amperes RMS symmetrical, unless noted otherwise at the bottom of the panel schedules. Breaker trip sizes and number of poles as indicated on the Drawings.

B. Bussing:

1. Copper or aluminum.

2. Tap Arrangement: Phase sequence type, permitting a two (2) or three (3) pole breaker to be installed at any location.

3. All bolts used to connect current-carrying parts together shall be accessible for tightening from the front of the panel.

4. Wiring terminals: Compression or set screw type for copper conductors; bolted to bus.

C. Construction: Flush or surface mounted as indicated with following:

1. Door with lock all keyed alike. National No. 68-226 flush panel.

2. Flush mounted panels: Concealed mounting hardware for exterior trim and door. No exposed fastenings or holes permitted. Flush mounted panel located side by side are to be of same length unless otherwise indicated. Flush panels of depth greater than available wall thickness provided with box type exterior trims with edges returned to wall. Depth of return as required making up difference in depth between panel and available wall depth. Panelboards 400 amp or less shall not exceed 6” depth.

3. Surface mounted panels: Completely metal enclosed. Exposed trim fastenings and hardware permitted. Surface mounted panels located side by side to be same height and depth.

4. Gutters minimum of five inch with six inch required at feeder end of panel or where feeder runs inside of gutters. Separate feeder lugs and terminals for each feeder connection with lugs as specified in Section 26 0519 Conductors and Cables. Split door split bus panels provided with two-inch separation of sections.

2.02 Circuit Breakers

A. Multiple breakers common trip.

B. Combination breaker and ground fault interrupter: 10,000 amps or 20,000 IC rated, bolted connection.

C. Location of circuit breakers in panels: Install circuit breakers in panels at locations as indicated in the panel schedules.

D. Main breaker, when so equipped, shall be individually mounted separate from branch breakers. Where used as service disconnect, breaker and panelboard shall be listed for use as service entrance equipment.

E. Branch circuit breakers shall be bolt-on.

F. Provide circuit breaker handle guards to prevent accidental shut-off of equipment for breakers supplying obviously constant circuits for clocks, time switches, refrigeration, freezers, sound systems, fire alarm and other like systems as directed.

2.03 Identification:

A. Panelboards: In accordance with Section 26 0500. Locate nameplates attached to top center of interior trim. Nameplate to indicate panel, voltage and phase characteristics such as Panel 2AA, 120/208 volt, three phase. Panel labeling to correspond to distribution system labeling.

B. Circuit breakers: Number circuit breakers as indicated in panel schedules. Numbers engraved and filled in interior trim or permanently attached metal numbers equal to Wilson Heard markers or plastic numbers. Adhesive backed printed numbers not approved. Other methods of numbering as approved by Engineer.

C. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018-inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.

D. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.

2.04 Panel finish:

A. All panels shall be provided with a rust-inhibiting phosphatized primer coating approved by the paint manufacturer.

B. At all finished areas factory finish to match adjacent surfaces. Rodda Baking Enamel.

C. In unfinished or utility areas standard factory industrial gray.

D. Paint sides, top and front of surface mounted panels.

2.05 Lugs:

A. In accordance with Section 26 0519, Conductors and Cables.

B. Compression or set-screw type, bolted to bus or CB output.

C. Provide double or feed thru lugs at panels where feeders are extended to additional panels.

D. Provide double capacity neutral lugs for all panelboards having an isolated bus.

E. Provide oversized lugs as required for aluminum panel feeders to accommodate sizes shown in feeder schedule on drawings.

2.06 Acceptable Manufacturers: Square-D, GE, Cutler-Hammer, or approved. For electronic grade panelboard suppression/filter system: GE, Current Technologies, Liebert, or approved.

PART 3 EXECUTION

3.01 Inspection

A. Coordinate NEC clearance requirements space provided to assure adequate clearances are maintained. Notify Engineer if space provided is inadequate for specified equipment and/or for maintaining required code clearances. Do not order equipment until any space inadequacies are resolved.

3.02 Installation

A. Prior to installation of switchgear and transforming layout the electrical rooms and obtain approval of the layout from the code authority having jurisdiction.

B. Install panelboard in accordance with manufacturer's written instructions.

C. Furnish and install three spare one-inch conduits from the top of each recessed panel, to an accessible point above the ceiling.

D. Conduit shall be securely fastened to all panelboards and sheet metal outlet, junction, and pull boxes with galvanized locknuts, and one bushing installed in accordance with standard practice. The full number of threads shall project through to permit the bushing to be drawn tight against the end of the conduit, after which the locknut shall be made up sufficiently tight to draw each into firm electrical contact with the box.

E. Do not install exterior trims until finish painting is completed. Clean interior of panel (construction dust, paint over-spray, etc…) prior to installation of exterior trim.

F. Keys: Collect all panel keys. Combine all keys on one key ring and submit at time of substantial completion.

G. No low voltage wiring (less than 120 volt) to be installed in panel enclosures.

H. Breaker handle guards shall be provided on each circuit supplying obviously constant loads to prevent accidental shutting off. Such loads are refrigeration, contactor controlled circuits, freeze protection, etc.

I. Care shall be taken to terminate ground conductors from isolated ground receptacles only on the isolated ground bus in a panel. Do not terminate bonding conductors on an isolated ground bus.

J. Bolt panelboards to wall structure as required for appropriate seismic zone. Provide adequate backing as required.

K. All nameplates, labels, screws, bolts, or other hardware shall be in place prior to acceptance.

L. Install floor-mounted equipment on a three-inch high concrete pad extending three inches beyond front and sides of said equipment. Level and securely fasten equipemtn to concrete pad.

M. Provide four-foot wide rubber insulation mats on floor in front of switchboard for its entire length.

3.03 Power One-Line Diagram

A. Mount one-line diagram from Plans at main distribution assembly. Use a clean copy and mount under clear plastic cover, set in a metal frame.

3.04 Field Test

A. Prior to energizing distribution equipment, perform following test and adjustments according to manufacturer's recommendations and instructions.

B. Continuity check.

C. Insulation level (megger) tests.

D. Short circuit test.

3.05 Adjustment And Cleaning

A. Tighten bus connections and mechanical fasteners. Check bus-to-bus and breaker-to-bus connection for correct torque tightening.

B. Tighten feeder and circuit breaker connections as recommended by the manufacturer.

C. Clean all foreign matter from interior and exterior of equipment and touch-up scratched or marred surfaces to match original finish.

D. Adjust interior trim to fit tight against exterior trims.

E. Check all moving mechanical parts for proper operation.

END OF SECTION

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SECTION 26 2730
WIRING DEVICES, FLOOR BOXES & CONTROLS

PART 1 - GENERAL

1.01 Description

A. Provide all wiring devices and finish plates as required unless specifically indicated otherwise.

B. Related work in other sections includes:

1. Providing identification, Section 26 0500, Basic Electrical Materials and Methods.

2. Providing conductors, Section 26 0519, Conductors and Cables.

3. Providing boxes, Section 26 0533, Raceways and Boxes.

1.02 Quality Assurance

A. American National Standards Institute (ANSI): 467 Grounding and Bonding Equipment (ANSI/UL467). 498 Attachment Plugs and Receptacles (ANSI/UL498). C73 Series Dimensions of Attachment Plugs and Receptacles.

B. Federal Specification (FS): Electrical Power Connector, Plug, Receptacle and Cable Outlet. W-C-596D, E and F. Switches, Toggle (toggle and lock), Flush Mounted WS 896-E.

C. National Electrical Manufacturer's Association (NEMA): WD 1-79 General Purpose Wiring Devices.

D. National Fire Protection Association (NFPA): NFPA 70 National Electrical Code.

E. Underwriters' Laboratory (UL): UL-20 Standard for Snap Switches.

1.03 Submittals

A. Submit product data sheets per Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

B. Occupancy sensor system submittals shall include:

1. Floor plans, same scale as the electrical drawings, showing device locations, sensor coverage pattern, and sensor type.

2. Wiring diagrams.

3. Mounting details.

4. Complete material list with catalog sheets showing all components to be used in the system.

C. Submit operation and maintenance data per Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

1.04 Product Delivery, Storage And Handling

A. Deliver with UL label and bearing manufacturer's name in manufacturer's original unopened and undamaged cartons with labels legible and intact.

B. Store and handle material so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.

PART 2 - PRODUCTS

2.01 Acceptable manufacturers: Arrow-Hart, General Electric, Hubbell, Leviton, Pass & Seymour or approved.

2.02 Switches: Specification Grade, Quiet Type, Minimum rating 120/277 volt, 20 amp unless otherwise noted. Finish color WHITE

A. Toggle and lock switches: Federal Specifications as listed in Quality Assurance.

1. Single Pole Switch: Arrow-Hart 1991 or approved.

2. Double Pole Switch: Arrow-Hart 1992 or approved.

3. Three-way Switch: Arrow-Hart 1993 or approved.

4. Four-way Switch: Arrow-Hart 1994 or approved.

5. Lock Switch: Corbin Type, Arrow-Hart 1191N or approved.

B. Momentary contact switch: Three position, two circuit with center "off", 20 amp, 120/277 volt. Arrow Hart 1995; or approved.

C. Wall Box Dimmers:

1. Modular full wave solid-state unit with integral quiet on-off switch and audible and electromagnetic noise filters.

2. Thin profile.

3. 1,000 watt (unless noted otherwise)

4. 120/277 volt rated.

5. Lutron Nova-T Vareco NVT-1000 or approved.

2.03 Receptacles: Specification Grade. Conform to Federal Specifications as listed in Quality Assurance. Finish color WHITE.

A. Duplex, double parallel slot 20 ampere, 120 volt, typical locations, Arrow-Hart 5362 or approved.

B. Ground fault circuit interrupter receptacle: 20 ampere, duplex, double parallel slot, Arrow-Hart GF5362 or approved.

C. Tamper resistant 15 ampere, 120 volt duplex receptacle. Arrow-Hart TR82 or approved.

D. Flush floor receptacles to be duplex and to have brass, hinged flap lids. Provide carpet flanges in carpeted floors. See also Recessed Floor Boxes.

2.04 Finish plates:

A. At surface wiring, raised galvanized industrial type. National Association of Electrical Distributors 12000 Series.

B. At all typical location: WHITE thermoplastic. Arrow-Hart or approved.

C. Engraved plates: See Execution for requirements.

D. Receptacles fed by emergency circuits shall have red devices with “EMERGENCY POWER” engraved in white letters on a red nylon plate with panel and circuit number designation engraved on plate.

E. Damp location receptacle finish plates: Stainless steel, type 302 horizontal plate. Arrow-Hart 4501 or approved.

F. Wet locations (exterior) receptacle finish plate: UL listed to be weatherproof while in use. Cover base to be constructed of heavy duty noryl and cover to be constructed of lexan. Thomas & Betts. Perfect Line Weatherproof cover or approved.

G. Telephone and Data: Blank coverplate, finish to match receptacle.

H. Plate Securing Screws: Metal with heads finished to match finish plate.

PART 3 - EXECUTION

3.01 Inspection

A. Determine outlet boxes, raceways and conductors are properly installed and outlet boxes are cleaned of all foreign matter before installing devices and finish plates.

B. Inspect each wiring device for defects.

3.02 Installation

A. Install wiring devices in accordance with NECA “Standard of Installation”.

B. Do not install devices or finish plates until final painting is complete.

C. Switches:

1. Install switches with the OFF position down.

2. Do not group or gang switches in outlet boxes unless they can be so arranged that voltage between adjacent switches does not exceed 300 volts, or installed in boxes equipped with permanently installed barriers between adjacent switches.

D. Verify mounting location of photo controls to insure proper operation from outside lighting. In general, photo control mounting exposed to north.

E. Receptacles:

1. Install a separate green or bare wire between the receptacle strap grounding (green) screw and a screw into the outlet box. Self-grounding strap not approved as grounding means.

F. Finish Plates:

1. Install devices and finish plates plumb with building lines.

2. Use jumbo size plates for outlets installed on masonry walls.

3. Do not install finish plates until final painting is complete.

G. Wall Box Dimmers:

1. Install dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

2. Do not share the neutral conductor on load side of dimmers.

3.03 Identification

1. Switches: Where 2 or more switches are ganged and where indicated, identify each switch with approved legend engraved on wall plate.

2. Receptacles: Identify the panelboards and circuit number from which served. For nylon faceplates, engrave panel and circuit number on face and highlighted in contrasting color. For stainless steel plates use machine printed, pressure sensitive, abrasion resistant label tape on face of plate and durable wire markers or tags within outlet box.

3.04 Testing

A. Operate each wall switch with circuit energized and verify proper operation.

B. Verify that each receptacle devices is energized.

C. Test each receptacle for proper polarity.

D. Test each drive for ground continuity.

E. Test each ground fault circuit interrupter operation with both local and remote fault simulations according to manufacturers recommendations.

3.05 Cleaning

A. Internally clean device, device outlet box and enclosure.

B. Replace stained or improperly painted finish plates or devices.

END OF SECTION

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SECTION 26 3200
POWER GENERATOR SYSTEMS

PART 1 - GENERAL

1.01 Description

A. Provide a factory built, prototype tested, production tested, field tested, complete and operable emergency electric generation system including all equipment specified herein, shown on the drawings, and as required for the service. The standby system to include automatic transfer switches, engine/generator, controls, NFPA required remote shut-off, batteries, silencer, complete exhaust system, rain cap, accessories, tests, documents and services needed to meet the performance requirement of this section.

B. Equipment to be manufactured by a single manufacturer who has been regularly engaged in the production of engine/generator sets, transfer switches and controls for a minimum of ten years, as to provide a single source responsibility to the owner for warranty, parts and service. Manufacturer to have local representatives who can provide factory trained service personnel, with adequate stock of replacement parts and can provide technical assistance for the entire emergency electric generation system. Manufacturer to provide printed literature and brochures of the specific equipment proposed.

C. Provide weatherproof enclosure for all exterior installations.

1.02 Testing: Testing to consist of factory prototype model tests per NFPA 110, factory production model test, and certified tests as follows:

A. Prototype testing shall be performed on separate prototype models, not on the equipment sold. Certification shall be submitted certifying the following tests have been performed:

1. Maximum power level (kW).
2. Maximum motor starting capacity (kVA).
3. Structural soundness.
4. Torsional analysis per MIL-STD 705B, Method 504.2. Calculations based on engine and generator separately are not acceptable.
5. Engine-alternator cooling air flow.
6. Alternator temperature rise.
7. Harmonic analysis and voltage wave form deviation per MIL-STD 705B, Method 601.4.
8. Three phase short circuit test.
9. Failure mode test for voltage regulator.
10. Endurance test and rated load and speed.

B. Factory production model tests shall be made, prior to shipment, of all system components. These tests shall be performed under rated load and power factor (unity power factor is not acceptable). Other tests shall include:

1. Single step load pickup per NFPA 76A.
2. Transient response and steady state governing.
3. Functional compatibility between generator set controls and transfer switch controls.

C. Field tests: See Installation.

1.03 Warranty: Five year, or 1500 hours of operation, whichever occurs first, from the time of initial start-up. Warranty shall be supplied by the system manufacturer.

1.04 Related work in other sections includes:

A. Providing identification, Section 26 0500, Basic Electrical Materials and Methods.

B. Providing conductors, Section 26 0519, Conductors and Cables.

C. Providing grounding, Section 26 0526, Grounding and Bonding.

D. Providing raceways, Section 26 0533, Raceways and Boxes.

E. Providing main fuel tank, necessary piping, outside air intakes and exhausts including ductwork and louvers, Division 23.

1.05 Quality Assurance

A. UL listed.

1.06 Submittals

A. Submit product data sheets in accordance with Division 01 or 26 0500, Shop Drawings and Material Lists, Basic Electrical Materials and Methods (when included).

1. Composite assembly drawing of the complete engine and generator showing dimensions and weight of the unit and locations of all auxiliary equipment, in front, rear and both side views.

2. Electrical interconnection diagram including generator, voltage regulator, control panel, circuit breaker, batteries, jacket heater, switches and accessories.

3. Complete identification of all components and materials by manufacturer, model number, rating and material.

4. Complete engine and generator voltage dip and load data.

5. Single line generator power diagram.

6. Complete surface preparation and finish data for the engine, generator, panels, frame, housing, and other surfaces.

7. One copy of manufacturer’s maintenance instructions to assist in review.

8. Parts list for all components and list of recommended spare parts.

9. Factory test report.

a. After fabrication and testing, but before shipping from the factory, submit results of the factory tests for review. Do not ship generator until the factory test results are reviewed and approved by the Engineer.

B. Submit operation and maintenance data in accordance with Division 01 or 26 0500, Electrical Equipment and Maintenance Manuals, Basic Electrical Materials and Methods (when included).

1.07 Product Delivery, Storage And Handling

A. Deliver with UL labels and bearing manufacturer's name.

B. Deliver in manufacturer's original unopened and undamaged crates, or packages.

C. Store and handle so as not to subject material to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.

PART 2 - PRODUCTS

2.01 General:

A. Generator rated minimum 50 kW at Prime rating. It is the responsibility of the generator supplier to safely and adequately size the generator to start and continuously power the loads described in this specification. The engine generator shall be capable of starting and operating the sequentially started loads as specified. The instantaneous voltage dip shall not exceed 35 percent.

B. System voltage: 120/240 volt, single phase

C. The generator set shall be mounted on a suitable steel base for mounting on a level surface and equipped with vibration isolators. Steel base to be sufficiently rigid to prevent deflection between vibration isolators.

2.02 Engine-Generator Set:

A. The engine shall be stationary, liquid cooled, PROPANE GAS. Design shall be turbocharged, after-cooled four cycle.

B. Engine equipment to include the following:

1. Remote two wire negative ground starting system. Gear engaging, positive shift, starter. Two independent methods to disconnect the starting circuit upon engine starting.

2. Positive displacement, mechanical full pressure lubrication pump, oil filters, oil level indicator, oil drain. Pipe crankcase drain to outside of engine base frame and terminate with plugged globe valve. Locate convenient for crankcase oil changing.

3. Electric fuel transfer pump, automatic fuel shut-off, replaceable dry element air cleaner, all mounted on engine.

4. Mechanical governing system to automatically control generator frequency from no load to full load rated output.

5. Low coolant level shutdown, which shall activate high engine temperature lamp and shutdown.

6. Engine mounted, thermostatically controlled water jacket heater to aid in quick starting. Heater shall be rated 2000 watts, 125 volts, single phase, 60 Hz. with disconnect when engine is running.

7. Battery & Charging System:

a. Automatic battery charging alternator with solid-state voltage regulation.

b. Battery: Provide starting battery mounted in attached battery racks with non-conducting bottoms. The battery shall be guaranteed for one (1) year and the manufacturer shall install a new battery for any battery found defective within the guarantee period. Battery shall be rated minimum 460 amps cranking performance for 0o F/cold.

c. Battery Charger: Provide a battery charger of the SRC voltage regulated type with float and taper features; 6-amp at 24 V.D.C.; 10-amp at 12 V.D.C. as required for generator set. Charger shall have charging ammeter and fuse protection. Charger shall not be damaged during engine cranking.

2.03 Engine Cooling System:

A. The engine shall have an engine driven water pump and a unit mounted radiator, fan and a thermostat temperature control. The radiator shall be provided with a duct adapter flange permitting the attachment of air discharge duct directing the discharge of radiator air through the wall.

B. Provide 50% ethylene glycol solution in system.

2.04 Fuel Systems:

A. Existing Propane.

2.05 Engine Exhaust System

A. The engine shall be equipped with an exhaust muffler as recommended by the generator set manufacturer. Muffler shall be of the residential type, rated for critical application. A flexible exhaust connection shall be provided for connection between the engine exhaust manifold and exhaust line, in compliance with applicable codes and regulations. Support muffler and exhaust line as per manufacturer's recommendations.

B. Exhaust line shall be as recommended by manufacturer with ceiling and roof penetrations as per applicable codes and regulations.

C. Exhaust outlet shall be provided with a rain cap.

2.06 Generator:

A. Generator to be single bearing, self aligning, four pole, synchronous type, revolving field design with temperature compensated solid-state voltage regulator and brushless rotating rectifier exciter system. No brushes will be allowed. Generator shall be directly connected to engine flywheel housing and driven through a flexible coupling to insure proper and permanent alignment. Insulation shall meet NEMA standards for Class F insulation. The 3-phase, broad range, reconnectable generator shall have 12 leads brought out to allow connection to obtain specified voltage.

B. Frequency regulation shall be three (3) percent from no load to rated load.

C. Voltage regulation shall be within plus or minus two percent of rated voltage, from no load to full rated load. A rheostat shall provide a minimum of plus or minus five percent voltage adjustment from rated value. Voltage regulator shall be insensitive to SCR or thyrister loads.

D. The alternator, exciter, and voltage regulator designed and manufactured by the generator set manufacturer so that the characteristics will be matched to the torque curve of the prime mover. System shall provide automatic voltage reduction if the load demand exceeds the engine capacity to prevent engine stalling and saturation of magnetic components. Systems that routinely select a linear-type (straight-line), constant volts/hertz characteristic, without regard for the engine power and torque characteristics, will not meet this specification.

E. Exciter three phase, full-wave, rectified, with heavy-duty silicon diodes mounted on the common rotor shaft and sized for maximum motor starting. Systems using three-wire solid-state control elements (such as transistors or SCR's) rotating on the rotor shaft shall not be acceptable.

F. Generator shall be provided with strip heater.

2.07 Engine-Generator Control:

A. Provide a lighted, unit mounted, control console, shock mounted, wired and tested by the generator manufacturer. Terminals identified as to their function, or purpose. Control terminals in generator control panel and automatic transfer switch to be identical for ease of connection by the contractor.

B. Control console shall include the following:

1. Engine controls and gauges.

a. Dual range AC voltmeter.

b. Dual range AC ammeter.

c. Frequency meter.

d. Four position AC voltmeter-ammeter phase selector switch to read line current and voltage in each phase with an off position.

e. Battery charging rate ammeter.

f. Oil pressure gauge.

g. Running time meter.

h. Coolant temperature gauge.

i. AC meters shall be 3-1/2 inch, two percent accuracy.

2. Three position selector switch (Run-Stop-Remote).

3. Contacts for engine start and stop.

4. Engine monitor (solid-state) with fault lights and external alarm terminals for overcrank, overspeed, high coolant temperature, low oil pressure, low fuel, and low engine coolant temperature. Engine shutdown provided for overcrank, overspeed, high coolant temperature and low oil pressure. Pre-alarms shall be provided for high coolant temperature and low oil pressure. Contacts shall be provided for remote annunciation of the above.

5. Provide an adjustable solid-state cycle cranker that shall disconnect the starting control after 60 seconds and a minimum of three cranking attempts.

6. Solid-state voltage regulator with voltage adjusting rheostat.

7. Manual reset field circuit breaker.

2.08 Starting Control Panel. The starting control panel for the generating set shall include the following:

A. A fused DC circuit.

B. Complete two-wire start/stop control, which shall operate on closure of a remote contact.

C. Speed sensing and a second independent starter motor disengagement systems shall protect against starter motor engagement with a moving flywheel. Battery charging alternator voltage will not be acceptable for this purpose.

D. The starting system shall be designed for restarting in the event of a false engine start, by permitting the engine to completely stop and then reengage the starter.

E. Cranking cycler with ten-second ON and OFF cranking periods. Over crank protection designed to open the cranking circuit after 60 seconds if the engine fails to start.

F. Circuitry to shut down the engine when signal for high coolant temperature, low oil pressure, or over speed are received.

G. Three-position (Automatic-OFF-Test) selector switch. In the TEST position the engine shall start and run regardless of the position of the remote starting contacts. In the Automatic position, the engine shall start when contacts in the remote control circuit close and stop five (5) minutes after those contacts open. In the OFF position, the engine shall not start even though the remote start contacts close. This position shall also provide for immediate shutdown in case of an emergency. Reset of any fault shall also be accomplished by putting the switch to the OFF position.

H. Test button for indicating lights.

I. Alarm horn with silencer switch.

2.09 Automatic Transfer Switch (ATS):

A. General: The automatic transfer switches to be designed, built, tested, furnished and warranted by the engine-generator manufacturer to ensure one source of responsibility for the entire standby system. The transfer switches to be provided with the same five-year warranty as the engine-generator set.

B. Operation: The ATS shall sense complete loss of normal power on any phase and signal the emergency generating set to start within 10 seconds after normal power failure. When the emergency power attains proper voltage and frequency, the ATS will automatically transfer the load to emergency power. When the normal power is restored, the ATS shall sense this and retransfer the load from emergency power to normal power, and signal the emergency source to stop.

C. Rating:

1. The transfer switch shall be rated for all classes of load including inductive and non-inductive load at 600 volts and tungsten lamp load at 250 volts. The transfer switch portion of the control shall be designed, built, and tested to close on an inrush current up to and including twenty (20) times the continuous rating of the switch without welding or excessive burning of the contacts. The transfer switch shall be capable of switching the load up to and including fifteen (15) times the continuous rating of the switch and capable of enduring six thousand (6,000) cycles of operation, at rated current, at a rate of six (6) cycles per minute, without failure. One cycle shall consist of one complete opening and closure of both sets of contacts on an inrush current of ten (10) times the continuous rating of the switch.

2. Refer to the project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, voltage and ampere ratings, enclosure type, and accessories. Unless otherwise noted on the drawings, transfer switches operating at 150VAC (line to neutral) and lower, and transfer switches serving exclusively 3-wire loads shall be 3-pole with solid neutral. All other transfer switches shall be 4-pole.

3. Main contacts shall be rated for 600 Volts AC minimum.

4. Transfer switches shall be rated to carry 100 percent of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C, relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000M).

5. Transfer switch equipment shall have withstand and closing ratings (WCR) in RMS symmetrical amperes greater than the available fault currents shown on the drawings and at the specified voltage. The transfer switch and its upstream protection shall be coordinated. The transfer switch shall be third party listed and labeled for use with the specific protective device(s) installed in the application.

D. Construction:

1. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the source 1 and source 2 positions. The transfer switch shall be specifically designed to transfer to the best available source if it inadvertently stops in a neutral position.

2. An indoor, non-ventilated NEMA 1 enclosure with key locked door shall house the transfer switch and control components. The indicating lamps and meters shall mount on the front to be visible without opening doors.

3. The transfer switch, with terminal lugs for either copper or aluminum wire, shall have individual heat resistant chambers enclosing solid silver cadmium oxide, double break contacts. Provide with arc chutes that have covers for extinguishing arcs and preventing interphase flashover. The transfer switch, with mechanical and electrical and interlocks to prevent simultaneously energizing both normal and emergency service shall be mechanically held on line side with auxiliary contacts rated 6-amp, 120 volt AC; 3-amp, 240, AC on line side and generator side of transfer switch.

4. Transfer switches designated on the drawings as 4-pole shall be provided with a switched neutral pole. The neutral pole shall be of the same construction and have the same ratings as the phase poles. All poles shall be switched simultaneously using a common crossbar. Substitute equipment using overlapping neutral contacts is not acceptable.

5. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

E. The operating power for transfer and retransfer to be from the engine generator set. Controls to automatically retransfer to the normal source if the emergency source fails.

F. Operator Panel: Operator Panel. Each transfer switch shall be provided with a control panel to allow the operator to view the status and control operation of the transfer switch. The operator panel shall be a sealed membrane panel rated NEMA 3R/IP53 or better (regardless of enclosure rating) that is permanently labeled for switch and control functions. The operator panel shall be provided with the following features and capabilities.

1. High intensity LED lamps to indicate the source that the load is connected to (source 1 or source 2); and which source(s) are available. Source available LED indicators shall operate from the control microprocessor to indicate the true condition of the sources as sensed by the control.

2. High intensity LED lamps to indicate that the transfer switch is “not in auto” (due to control being disabled or due to bypass switch (when used) enabled or in operation) and “Test/Exercise Active” to indicate that the control system is testing or exercising the generator set.

3. “OVERRIDE” pushbutton to cause the transfer switch to bypass any active time delays for start, transfer, and retransfer and immediately proceed with its next logical operation.

4. “TEST” pushbutton to initiate a preprogrammed test sequence for the generator set and transfer switch. The transfer switch shall be programmable for test with load or test without load.

5. “RESET/LAMP TEST” pushbutton that will clear any faults present in the control, or simultaneously test all lamps on the panel by lighting them.

6. The control system shall continuously log information on the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. This information shall be available via a PC-based service tool and an operator display panel.

7. Alphanumeric display panel:

   a. Display source condition information, including AC voltage for each phase of normal and emergency source, frequency of each source. Voltage for all three phases shall be displayed on a single screen for easy viewing of voltage balance. Line to neutral voltages shall be displayed for 4-wire systems.

   b. Display source status, to indicate source is connected or not connected.

   c. Display load data, including 3-phase AC voltage, 3-phase AC current, frequency, KW, KVA, and power factor. Voltage and current data for all phases shall be displayed on a single screen.

G. Internal Controls

1. The transfer switch shall incorporate adjustable time delays for generator set start (adjustable in a range from 0-15 seconds); transfer (adjustable in a range from 0-120 seconds); retransfer (adjustable in a range from 0-30 minutes); and generator stop (cooldown) (adjustable in a range of 0-30 minutes).

2. Automatic bypass to re-transfer the load from generating set to normal power source if the emergency set should fail during the delay period.

3. Provide an exerciser clock to automatically start the generating set at regular intervals and allow it to run for a preset time period, such as 30 minutes per week.

4. Provide a with/without load selector switch to test or exercise the generator.

5. Transfer switch voltage sensors shall be close differential type, providing source availability information to the control system based on the following functions:

   a. Monitoring all phases of the normal service (source 1) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of normal voltage level).

   b. Monitoring all phases of the emergency service (source 2) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of pickup voltage level).

   c. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for loss of a single phase..

H. Control Interface

1. The transfer switch will provide an isolated relay contact for starting of a generator set. The relay shall be normally held open, and close to start the generator set. Output contacts shall be form C, for compatibility with any generator set.

2. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.

2.10 Emergency Shut-Off

A. Provide remote shut-off switch as required by NFPA.

B. Location: Field coordinate location of shut-off with owner / architect if not shown on the electrical plans.

C. Type:

1. Accessible to Public: If shut-off is accessible to public, provide device such that dual action is required to shut off generator.

2. Non-Accessible: If shut-off is located such that it is not typically accessible to the public, device may be red mushroom push button or other suitable device.

2.11 Spare Parts

A. The following spare parts shall be furnished.

1. Three lubricating oil filter elements and gaskets.

2. One air cleaner filter element.

3. Two sets of V-belts for fan and pump drives.

4. Five gallons of ethylene-glycol antifreeze solution.

2.12 Acceptable Manufacturers: Caterpillar, Cummins, Kohler, Onan, or approved equal.

PART 3 - EXECUTION

3.01 Inspection

A. Examine all areas to receive engine generator set, transfer switches and coordinate work with other trades. In case of question consult engineer prior to proceeding with work.

3.02 Installation

A. Install all equipment in strict accordance with manufacturer's written instruction. Entire installation to be under the supervision of equipment manufacturer's authorized factory representative.

B. Install engine generator on shock absorbers and verify installation requirements with existing conditions.

C. See drawings for exact location of all equipment. Provide mechanical contractor all rough-in drawings and dimensions as required for connections of main fuel tank, and radiator duct and air openings through exterior walls.

D. Coordinate intake and exhaust louver sizes to meet manufacturer’s recommendations for airflow and pressure loss.

E. Testing and adjusting: Manufacturer's representative of standby system to be present at the time of start-up for testing and owner orientation. Notify Owner and Engineer 48 hours in advance prior to Operation Test. The tests to include:

1. Two hours at 100 percent of generator set rating.

2. Simulated power failure tests utilizing the transfer switch and its time delays and the building load (two hours).

3. A fifteen minute engine/generator cool down period without load before shutdown.

4. All testing shall include records at fifteen minute intervals of water temperature, oil pressure, ambient air temperature, voltage, current, frequency, kW and power factor. Provide test data in triplicate, to the Owner's Agent.

F. Provide wiring from fuel low-level switch in main fuel tank to the Engine Generator Control Panel and provide relay in NEMA 1 enclosure at fuel tank to close contacts of relay on low fuel.

END OF SECTION

SECTION 26 5100
LIGHTING FIXTURES

PART 1 - GENERAL

1.01 Description

A. Provide lighting fixtures of type and wattages indicated on Drawings by letter and number shown adjacent to lighting outlet symbol. A fixture typical for location is to be installed at every lighting outlet unless otherwise indicated.

B. Provide fixtures complete with lamps, ballasts, reflectors, diffusers, lenses, shielding, hangers, and accessories.

C. Related work in other sections includes:

1. Providing concrete bases for poles, Division 03.

2. Providing conductors and connectors, Section 26 0519, Conductors and Cables.

3. Providing raceways and fittings, Section 26 0533, Raceways and Boxes.

4. Providing fire rated enclosures at light fixtures.

1.02 Quality Assurance

A. UL listed or CSA certified for application.

B. NEMA SSL 1: Electronic Drivers for LED Devices, Arrays, or Systems.

1.03 Coordination

A. Confirm compatibility between final luminaire and lighting control selections.

B. Confirm compatibility and interface of other materials with luminaire and ceiling system. Report discrepancies to the Engineer/Architect and defer ordering until clarified.

C. Supply plaster frames, trim rings and backboxes to other trades.

D. Coordinate with Division 23 to avoid conflicts between luminaires, supports, fittings, and mechanical equipment.

1.04 Submittals

A. Submit a complete list of fixtures, lamps and ballasts with catalog numbers, manufacturer's drawings, photographs or catalog sheets for approval prior to ordering fixtures. Submittal to be in accordance with Division 01 or 26 0500, Shop Drawings and Materials Lists (when included).

B. Submit operation and maintenance data in accordance with Division 01 or 26 0500, Electrical Equipment Maintenance Manuals (when included).

1.05 Product Delivery, Storage And Handling

A. Deliver fixture in manufacturer's original unopened packages with labels legible and intact.

B. Deliver with UL label and bearing manufacturer's name.

C. Deliver poles wrapped and protected from damage.

D. Store and handle so as not to subject materials to corrosion or mechanical damage and in manner to prevent damage from environment and construction operation.

PART 2 - - PRODUCTS

2.01 General:

A. Fixture types: See light fixture schedule on drawings for fixture types and acceptable manufacturers.

B. Provide fixtures with ACL, damp or wet label if required for the applications indicated.

C. All recessed fixtures shall be free of light leaks.

2.02 Approved Manufacturers:

A. See Light Fixture Schedule on drawings for approved manufacturers and specifically approved products (models).

B. Listing of a manufacturer on the Light Fixture Schedule (or other Contract Documents) does not constitute the approval of a specific fixture model not otherwise specifically identified on the Light Fixture Schedule.

C. The supplier/contractor is responsible to provide approved light fixtures that meet the requirements as specified herein and on the drawings (Light Fixture Schedule, general and keyed notes, etc.).

D. Other manufacturer's products submitted for approval must meet the aesthetic appearance and quality standards of the specific model listed as the basis of design. The contractor shall, at the discretion of the Engineer and/or Architect and at no cost to the Owner, replace any product deemed inferior to the specifically specified light fixture model.

2.03 Recessed Luminaires

A. Supply recessed luminaire complete with trim type required for ceiling system installed. Before ordering, confirm ceiling construction details and architectural finish for each area.

B. Confirm recessed luminaires are suitable for installation where encountering sloped ceilings.

2.04 LED (Light Emitting Diode):

A. LED manufacturer will include, but not be limited to, light source, luminaire, power supply and control interface with added components as needed for complete and functioning system.

B. Warranty: LED systems and complete luminaires must have a manufacturer's warranty of 3 year from date of substantial completion.

C. Compliance

1. LED light fixtures shall be in accordance with IES, NFPA, UL as shown on the Drawings and as specified.

2. LED light fixtures shall be Reduction of Hazardous Substances (RoHS) compliant.

3. Comply with ANSI chromaticity standard for classifications of color temperature. See luminaire schedule for specified LED lamp color and color temperature. UL or ETL listed and labeled.

4. Luminaire testing per IESNA LM-79 and LM-80 procedures.

D. LED drivers shall include the following features unless otherwise indicated:

a. Minimum Efficiency: 85% at full load.

b. Minimum Operating Ambient Temperature: -20°C (-4°F).

c. Input Voltage: 120-277V (±10%) at 60 Hz.

d. Integral short circuit, open circuit, and overload protection.

e. Power Factor: ≥ 0.95.

f. Total Harmonic Distortion: ≤ 20%.

g. 4-wire (0-10VDC voltage controlled) dimming driver. Capable of dimming from 100% to 5% light output, unless otherwise noted, and step to 0%. Driver shall respond similarly when raising from 0% to 100%.

h. Driver shall be free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10).

E. Lamp life

1. White LEDs: 50,000 plus hours with lamp failure occurring when LED produces 70 percent of initial rated lumens (IES L70).

2. Color LEDs: 30,000 plus hours with lamp failure occurring when LED produces 50 percent of its initial rated lumens.

F. Provide shop drawings, with LED systems based on lumen output at 70 percent lumen depreciation for white LEDs and 50 percent lumen depreciation for color LEDs. Initial lumens for all colors of LEDs must be listed individually.

G. LED Downlights: Housing, LED driver, and LED module shall be products of the same manufacturer.

H. LED Troffers:

1. LED drivers, modules, and reflector shall be accessible, serviceable, and replaceable from below the ceiling.

2. Housing, LED driver, and LED module shall be products of the same manufacturer.

I. Provide extra replacement LED driver for each fixture type in project. Quantity: 10%. Where a fraction occurs, round up to next larger integer.

J. LED light source manufacturers: Nichia, Cree, Osram/Sylvania, GE Lumination or approved.

2.05 Fixture lengths: Furnish fixtures of lengths shown on Drawings. At continuous runs furnish joiner plates, end plates and all required fittings.

2.06 Fixture mounting:

A. General: Provide all blocking and supports as required. Fixtures may be supported from ceiling system unless specifically indicated otherwise.

B. Surface mounted fixtures: Provide UL approved fixtures at low-density cellulose fiber ceilings. 1-1/2 inch spacers not permitted unless specified fixture is unavailable with low-density rating.

C. Recessed fixture: Provide fixtures with plaster frames, ceiling flanges and hangers as required for specific ceiling conditions. Verify ceiling types prior to ordering fixtures. Provide thermal protection for all High Intensity Discharge and Incandescent fixtures mounted in a recessed application (non lay-in ceiling).

D. Stem suspended fixtures: Provide stems with aligned canopies. Stems of length specified or required for proper mounting of fixture.

E. Positively attach all lighting fixtures to suspended ceiling systems. Attachment device to have capacity of 100 percent of lighting fixture weight acting in any direction.

F. Lighting fixtures weighing more than 20 pounds but less than 56 pounds shall have in addition to the requirements outlined above, two No. 12 gauge hangers connected from fixture housing to structure above. These wires may be slack. Fixtures weighing more than 56 pounds are to be suspended from the structure and not from suspended ceilings.

PART 3 - EXECUTION

3.01 Inspection

A. Verify location, ceiling types and mounting requirements for each fixture prior to ordering fixtures.

B. Verify voltage at each fixture outlet prior to installation.

C. Examine fixtures for damage or broken parts and replace prior to installation.

3.02 Installation

A. See architectural reflected ceiling plan for exact location of fixtures and ceiling types.

B. Coordinate installation of fixtures with other subcontractors, and verify methods of hanging and supporting required.

C. All fixtures to be illuminated at time of acceptance.

D. Fixtures located in mechanical and store rooms to be coordinated with ductwork, piping and structural members. Adjust stems as required for proper illumination of the area.

E. All recessed fixtures to be flex connected to branch circuit outlet box unless fixture is provided with code approved junction box. Connection to conform to Article 410-67 of NEC.

F. Fixtures recessed into fire rated ceilings shall be provided with an approved fire-rated enclosure or have an enclosure built around them that will not violate the fire rating of the ceiling.

G. All light outlets shall be supplied with a fixture. Outlet symbols on the drawings without a type designation shall have a fixture the same as those used in similar or like locations.

H. Fixtures of a given description may be used in more than one type of ceiling. The fixture list and electrical drawings do not indicate what type of ceiling a recessed fixture is intended for. Consult the Architectural Reflected Ceiling plan to obtain this information. The contractor shall confirm that the specified fixtures are compatible with the ceiling system and is responsible to provide all mounting apparatus required for proper installation.

I. Where fixtures are mounted under cabinets, in soffits, coves, or other physically restricting spaces, the contractor shall verify that the fixtures will fit the space prior to ordering.

J. Under cabinet and similar fixtures are to be hard wired. Flexible cords similar to SO cord are not acceptable.

3.03 Adjustment And Cleaning

A. Fixture supports shall provide proper alignment and leveling of fixtures.

B. Aim adjustable fixtures as directed by Architect or Engineer. Exterior fixtures should be adjusted for proper illumination of areas.

C. Clean all foreign matter from interior and exterior of fixtures and from exterior of poles, touch-up scratched or marred surfaces to match original finish.

3.04 Testing

A. Operate the complete exterior lighting system for seven (7) consecutive days. When the lighting performance is satisfactory to the Engineer, the system will be accepted.

END OF SECTION

SECTION 27 2500
TELEPHONE AND COMPUTER DATA

PART 1 - GENERAL

1.01 Description

A. Extend existing telephone and computer data system into new addition.

B. Remove and reinstall existing conduit and cabling to accommodate seismic upgrade.

C. Provide complete data/telephone distribution system including CAT5e conductors, devices with cover plates, boxes, terminal cabinets, etc., as indicated on Drawings.

1.02 Quality Assurance

A. Conform to requirements of serving utility.

B. UL Listed.

C. National Electrical Code with state and local amendments.

D. ANSI/TIA/EIA-568-A – Commercial Building Telecommunications Wiring Standard

E. EIA/TIA 569 – Commercial Building Standard for Telecommunications Pathways and Spaces.

F. EIA/TIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications.

G. IEEE 802.3y – Physical layer specifications for 100Mb/s.

1.03 Submittals

A. Submit equipment data sheets and shop drawings in accordance with 26 0500, Shop Drawings and Materials Lists, Basic Electrical Materials and Methods.

B. Submit operation and maintenance data in accordance with 26 0500, Electrical Equipment Maintenance Manuals, Basic Electrical Materials and Methods.

PART 2 - PRODUCTS

2.01 Rough-in Materials

A. Outlet Boxes: 4” square, 2-1/8” deep minimum with 1-gang device ring.

B. Conduits: 1” minimum size with larger sizes as indicated on the Drawings.

C. Pull Boxes: Sheet metal, primed and painted, screw cover.

2.02 Conductors

A. Unshielded twisted pair cable CAT 5e, 4-pair, 24 gauge copper unshielded twisted pair, PVC coated cable

B. CAT3 cable for telephone

2.03 Jacks

A. Panduit mini-com mini jack CAT5e with universal 568A or 568B pin-out. Verify color with Architect prior to order.

2.04 Face Plates

A. Panduit mini-com executive series vertical 2-port faceplates. Verify color with Architect prior to order. A blank of the same color is required for any ports not utilized during the installation of the network.

2.05 Patch Panels

A. Panduit or approved.

2.06 Equipment Racks

A. Provided by Owner. The ground for the rack shall be installed by contractor.

PART 3 - EXECUTION

3.01 Inspection

A. Verify location of all telephone and data outlets with architectural Drawings prior to roughing-in. Where outlets occur at built-in counters, desks, and bookshelves coordinate with other trades.

B. Examine area to receive terminals and equipment to assure adequate clearance.

3.02 General Installation

A. Verify installation requirement with serving utility. Stub conduit up nominally six inch above floor or below ceiling at terminal facilities provided by Telephone Company and lock into metal template with locknuts and insulating bushings.

B. Underground Service: Provide conduit down pole, elbow at bottom of pole and conduit from pole to terminal location inside building. Conduit to continue up exterior of building and terminate inside building at designated location. Other exterior raceways as indicated on Drawings.

C. Conduit bends to be large radius field bends or factory ells. At wall outlets at frame or metal studs telephone connector place telephone connector inside wall cavity and not in surface mounted box located over telephone outlet. Thru wall box and conduits at these locations to be properly supported.

D. Provide pull-in line in all empty raceways

E. Anchor plywood terminal board to the building structure. Use of toggle bolts to attach to the sheetrock is not an acceptable means of support.

F. Provide ¾" raceway and #6 solid copper wire to main electrical ground bus for Telco ground. The demarcation point must be within 20 feet of the main electrical ground. Verify exact requirements with Utility.

G. Provide conduit from outlet box into accessible ceiling space. Conduit to include bushings and pull-in line.

3.03 Cabling Installation

A. Strict adherence shall be made to Manufacturer's installation instructions and requirements. Where conflicts arise between the requirements of this specification and the manufacturer's installation instructions, the Architect shall be consulted for resolution.

B. All wiring systems shall be installed according to related standards as listed within TIA/EIA-569. All installed cables shall be kept free from nicks, abrasions, and cuts during storage and installation. Defective wiring will be replaced at the Contractor's expense in a manner that will not delay the progress of the project.

C. Installation shall provide minimal signal impairment by closely following manufacturer's installation guidelines, and by preserving wire twists as closely as possible to the point of termination.

D. Installation shall be neat, well organized, and of professional quality, with wire management and termination practices in accordance with manufacturer's guidelines. Cabling will be supported in the ceiling according to industry standard and manufacturer recommendations to minimize cross talk, EMI, and damage. Cabling is to be dressed and secured with Velcro Cable Ties from the point it enters the data room space to the point it enters the cable managers or is terminated.

E. All cables will be home run. Splicing of cables will not be accepted. All CAT 6 cables will be run to the data rack and terminated on the patch panel.

F. Leave 18" of coiled cable at each outlet, and 12" loosely coiled cable in the Horizontal Cable Manager in the data room in a way that does not kink the cable. Cable is to be installed in the data rack so the rack is not impaired, and can open to the fullest extent without cable interference.

G. Provide CAT 3, 25 pair cable from the TTB (demarc) to the data rack. Verify termination type with owner prior to installation. Provide a minimum of 10 feet of slack at each end of the cable (verify with owner).

3.04 Labeling

A. All cables shall be identified, by the Contractor, at both ends of the wiring run. Identification shall be made by legible, indelible marking on cable tags. Cable tags shall be affixed to the ends of each cable comprising the run. All tags are to be made for the purpose of labeling cables. The labels are to be done with a mechanical printing device such as a P-Touch or similar label maker. Hand written tags or labels are not acceptable.

B. Each cable shall be labeled at each end in the format given by the owner. The number shall be pre-printed on a cable tag, with the tag secured to the cable sheath no more than 4-inches from its termination. Verify labeling scheme to be used with the Owner or Architect

3.05 Testing

A. The Contractor shall perform all of the following tests, and provide all tools and instruments used to test the installed system. Test instruments used by the Contractor shall be suitable for the intended procedure and of industry-recognized standards.

B. The Contractor shall use a Fluke or equal twisted pair cable tester for the testing of all CAT 6 copper cabling installed in this contract. Provide test data in electronic format that does not require proprietary software to view and hard copy. The test results are to be placed into a 3-ring binder utilizing plastic sleeves with the test results in numeric or alphabetic order depending on labeling scheme used.

1. All cables shall be tested bi-directional for the following parameters: Wire map/continuity, length, attenuation, NEXT (near end cross talk), ELFEXT (equal level far end cross talk), delay and delay skew, return loss, and PSELFEXT (power sum equal level far end cross talk).

2. All test results are to meet the current industry standard for length and dB loss.

END OF SECTION

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SECTION 31-2316
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for footings, slabs-on-grade, and utilities within the building.

B. Temporary excavation support and protection systems.

1.02 RELATED REQUIREMENTS

A. Section 01-7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.

B. Section 02-4100 - Demolition: Shoring and underpinning existing structures.

C. Section 31-2323 - Fill: Fill materials, backfilling, and compacting.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Notify utility company to remove and relocate utilities.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Protect plants, lawns, rock outcroppings, and other features to remain.

F. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

B. Leave excavation support and protection systems, used as formwork or within 10 feet of existing foundations, permanently in place, unless otherwise noted.

C. Excavation support and protection systems not required to remain in place may be removed subject to approval of Owner or Owner's Representative.

3.04 EXCAVATING

A. Excavate to accommodate new structures and construction operations.
   1. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.

B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.05 SUBGRADE PREPARATION

A. See Section 31-2323 for subgrade preparation at general excavations.

3.06 FILLING AND BACKFILLING

A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.

B. See Section 31-2323 for fill, backfill, and compaction requirements at general excavations.

3.07 REPAIR

A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31-2323.

3.08 FIELD QUALITY CONTROL

A. See Section 01-4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.09 CLEANING

A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31-2200.

B. Remove excavated material that is unsuitable for re-use from site.

C. Remove excess excavated material from site.

3.10 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

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SECTION 31-2323
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for curbs, footing subgrades, building volume below grade, footings, slabs-on-grade, and utilities within the building.

B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Geotechnical report by Earth Engineers, February 7, 2025.

B. Section 31-2316 - Excavation.

1.03 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

F. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

H. Oregon Standard Specifications (OSS) - The Oregon Department of Transportation, ODOT/APWA Oregon Chapter Standard Specifications for Construction; 2021 Edition.

1.04 SUBMITTALS

A. See Section 01 7000 - Shop Drawings, Product Data, Samples for submittal procedures.

B. Soil Samples: 10 pounds sample of each type of fill; submit to testing laboratory.

C. Provide Standard Proctor (ASTM D 698/AASHTO T99)

D. Materials Sources: Submit name of imported materials source.

E. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

F. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Structural Fill: Use high quality, well-graded, maximum 1-1/2"-0 crushed rock, with less than 5 percent passing the U.S. Standard No. 200 sieve, compact to at least 95 percent of the maximum dry density, as determined by ASTM D698, with a liquid limit less than 45 and a plasticity index less than 25 in accordance with ASTM D4318. Class B Granular Fill shall conform to ODOT SS 00330.14, 2018 Oregon Standard Specifications for Construction.

B. Sand: Clean sand; washed;free of silt, clay, loam, friable or soluble materials, and organic matter.
   1. Graded in accordance with ASTM C136/C136M; within the following limits:
      a. No. 200 sieve: Less than 5 percent passing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify structural ability of unsupported walls to support imposed loads by the fill.

E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify, compact and proof roll subgrade surface to a depth of 6 inches to identify soft spots. Proof roll in the presence of the Architect. Do not place any fill in the building zone until proof rolling has been performed and observed by the Architect.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type B or Structural Fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, place 4 inches of compacted granular structural backfill over footing subgrades to protect the footing subgrades from foot traffic and the elements. Maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.

F. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

G. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 95 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Use Structural Fill unless otherwise specified or indicated.

3.05 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1/2 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1/4 inch from required elevations.

3.06 FIELD QUALITY CONTROL

A. See Section 01 4500 - Quality Control, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.

C. When using the nuclear method of ASTM D6938, the gauge shall be field calibrated according to ASTM standards.

D. For general fill, Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor").

E. For "Structural Fill" evaluate results in relation to compaction curve determined in accordance with ASTM D1557 ("modified proctor").

F. If tests indicate work does not meet specified requirements, remove work, replace and retest.

G. Frequency of Tests: For structural fill, tests shall be taken each day of production.

3.07 CLEANING

A. See Section 01-7419 - Cleaning for construction waste management and disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION